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EXTRACTED VERSION

OPERATION REDWING

Project 2.61 Rocket Determination of Activity Distribution Within the Stabilized Cloud

Pacific Proving Grounds May — July 1956

Headquarters Field Command Defense Atomic Support Agency Sandia Base, Albuquerque, New Mexico

April 28, 1960

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FOREWORD

This report has had classified material removed in order to make the information available on an unclassified, open publication basis, to any interested parties. This effort to declassify this report has been accomplished specifically to support the Department of Defense Nuclear Test Personnel Review (NTPR) Program. The objective is to facilitate studies of the low levels of radiation received by some individuals during the atmospheric nuclear test program by making as much information as possible available to all interested parties.

The material which has been deleted is all currently classified as Restricted Data or Formerly Restricted Data under the provision of the Atomic Energy Act of 1954, (as amended) or is National Security Information.

This report has been reproduced directly from available copies of the original material. The locations from which material has been deleted is generally obvious by the spacings and "holes" in the text. Thus the context of the material deleted is identified to assist the reader in the determination of whether the deleted information is germane to his study.

It is the belief of the individuals who have participated in preparing this report by deleting the classified material and of the Defense Nuclear Agency that the report accurately portrays the contents of the original and that the deleted material is of little or no significance to studies into the amounts or types of radiation received by any individuals during the atmospheric nuclear test program.

FOREWORD

This report presents the final results of one of the projects participating in the military-effect programs of Operation Redwing. Overall information about this and the other military-effect projects can be obtained from WT-1344, the "Summary Report of the Commander, Task Unit 3." This technical summary includes: (1) tables listing each detonation with its yield, type, environment, meteorological conditions, etc.; (2) maps showing shot locations; (3) discussions of results by programs; (4) summaries of objectives, procedures, results, etc., for all projects; and (5) a listing of project reports for the military-effect programs.

ABSTRACT

Forty especially developed atmospheric-sounding projectiles (ASP) were fired through the clouds resulting from Shots Cherokee, Zuni, Navajo, and Tewa to proof test a system for measuring gamma intensities within the clouds and to explore the spatial distribution of gamma activity within the stem and cloud resulting from the detonation of a nuclear device having a yield in the megaton range. Radiation intensity information was successfully telemetered out of the radioactive clouds by the ASP rockets and recorded on magnetic tape. Radiation intensities as high as 3 by 10⁴ r/hr were encountered within the cloud; intensities at the one measured point in the stem were negligible compared to the peak activity within the cloud. Contamination of rocket surfaces by radioactivity from the cloud did not appear to be of consequence. Total activities in the clouds computed from rocket data agreed in order of magnitude with activities derived from theoretical considerations.

PREFACE

This project was undertaken as a joint effort by members of the U.S. Naval Radiological Defense Laboratory (USNRDL) and Cooper Development Corporation of Monrovia, California. The responsibilities of Cooper Development Corporation were defined in Bureau of Ships Contract, No. NObs 72000. These included responsibilities for the design, development, and testing of the rockets used in the project, firing of the rockets in the field, recording of data from rockets fired in the field, and reduction of data. NRDL furnished field personnel, including a project officer, and was responsible for interpreting the reduced data as presented by the contractor.

The project officer extends his thanks and appreciation to those individuals and groups who through their cooperation and assistance contributed materially to the successful completion of the project. Their specific contributions are cited as follows: H.R. Wasson of USNRDL, who offered technical advice and assistance in the design and testing of the radiation transducer; Lieutenant (jg) M.H. Eklund of USNRDL, who prepared the general specifications for the radiation transducer, offered technical advice and performed the field calibration of the instruments; Captain and crew of the USS Knudson, APD-101, who assisted in the installation and operation of the shipboard telemetering receiving station; and Commanding Officer and men of Detachment A, Mobile Construction Battalion 5, who assisted in the installation of the rocket launching station and the Site Nan receiving station and performed the technical survey work.

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Chapter | | INTRODUCTION

1.1 OBJECTIVES

The specific objectives of Project 2.61 were to: (1) proof test a system using rocket-borne detection units with telemetering transmitters to explore the spatial distribution of radioactivity in the stem and cloud resulting from a nuclear detonation; (2) measure gamma intensities along several continuous known trajectories passing through the stem and cloud at 7 and 15 minutes after detonation; and (3) estimate the extent to which the rocket became contaminated as it passed through the stem or cloud.

1.2 BACKGROUND AND THEORY

Although various mathematical models for the fallout process have been presented (Reference 1), gross differences exist among the assumptions as to spatial distribution of radioactive emitters in the cloud and stem. Determination of the distribution which actually exists is essential to the development of a correct model and the eventual realistic predictions of fallout patterns. Without such knowledge there would be continuing uncertainties as to the spatial positions of active particles prior to fall, resulting in unreliable predictions of the spread and extent of activity. Besides being essential to the development of fallout theory, a knowledge of the distribution of radioactivity in the cloud and stem at early times may be important for interception, countermeasures, and long-range-detection studies.

Construction of an effective fallout model requires knowledge of the size, activity, and spatial distribution of radioactive particles in the stem and cloud. Of these parameters, particle size distribution and related activity were determined from particles collected as fallout at the surface of the earth by Projects 2.63 and 2.65. If, in addition, measurements of gamma intensities in the stem and cloud are made, gross distribution of active particles in the stem and cloud may be inferred. Restrictions due to time and equipment available before the operation precluded measurement by this project of any parameter except gamma activity as a function of time and position.

Measurements of radiation fields existing in clouds resulting from detonations of devices in the kiloton range have been made previously. The first measurement of cloud-radiation fields was made during Operation Greenhouse by the use of drone aircraft. These measurements were made in the stems of clouds resulting from explosions whose yields ranged from Fields of about 10⁴ r/hr were observed at 3 to 5 minutes after detonation and of about 350 r/hr at 30 minutes after detonation (Reference 2). During Operation Upshot-Knothole, cannisters and drone aircraft operated in the mushroom tops resulting from 11 to 26 kt explosions. Fields of about 10⁴ r/hr existed at 2 to 6 minutes after detonation (Reference 3).

During Operation Redwing, aircraft were flown through the stem and lower portion of six clouds resulting from detonations in the megaton range. Reference 4 gives as the average dose rates encountered when corrected to 100 percent-fission yield:

$$\bar{D} = 1.0 \times 10^5 \, t^{-1.7}$$
 (1.1)

Where: D = average dose rate, r/hr

t = time after detonation, minutes

This equation yields 3,700 r/hr and 1,000 r/hr as the average dose rate to be expected at 7 minutes and 15 minutes from a 100 percent-fission yield device. A vehicle, capable of carrying a radiation detector and telemetering equipment to at least the top of the highest cloud expected, was required to explore the spatial distribution of gamma activity in clouds resulting from multimegaton detonations. It was desirable that the vehicle be able to pass well out of the top or side of the cloud, so that an indication of the contamination of the vehicle could be obtained. Because of the altitudes involved and turbulent conditions existing at early times, manned or unmanned aircraft could not be used to measure activity within the higher regions of the cloud resulting from a megaton range device. The above, along with considerations of expense and logistic problems, indicated that a single-stage, rocket-propelled ballistic missile would serve best to carry the detector and telemetering equipment.

To serve as a basis of comparison for the activity distributions as determined by the rocket flights, theoretical estimates were prepared of the number of photons per second present at 7

TABLE 1.1 THEORETICAL ESTIMATES OF CLOUD ACTIVITY

	0 1 1	A	tivity, photons	/sec
Time	Contributor	Cherokee	Zuni	Navajo
min				
7	FP	29.3×10^{22}	7.69×10^{22}	3.69×10^{22}
	U ²³⁸	4.7×10^{22}	1.07×10^{22}	0.13×10^{22}
15	FP	14.8×10^{22}	3.92×10^{22}	1.89×10^{22}
	U ²³⁹	3.7×10^{22}	0.84×10^{22}	0.12 × 10 ²²

and 15 minutes after detonation (times at which the rocket measurements were made). The contribution to the total activity of the device components only was considered. The fission product activity, based on the slow neutron fission of U^{235} , at 7 and 15 minutes was found to be

respectively (Reference 5). At these early times, the induced activity contribution of U^{238} was considered. Other induced activities with gamma energies in the range that can be measured by the rocket transducer could possibly add around 5 percent to the activities tabulated in Table 1.1 depending upon materials used in the construction of the device and nearby structures. The other induced nuclides of Np²³⁸, U²⁴⁰, Np²⁴⁰ and U²³⁷ represented less than 1 percent of the activity due to the fission products. For capture-to-fission ratio of 1.0, the calculated activities of U²³⁹ at 7 and 15 minutes were 4.0 d/s/10⁴ fissions and 3.2 d/s/10⁴ fissions, respectively. Applying directly the capture-to-fission ratios 0.500, 0.427 and 0.125 as determined from actual samples obtained during Shots Cherokee, Zuni, and Navajo, the contribution of U²³⁹ to the total activity for the various events was then determined. The use of theoretical estimates (personal communication from C. F. Miller and N. E. Ballou, USNRDL) for the number of photons per disintegration for the fission products, 1.19, and U²³⁸, 0.83, and the number of fissions per kiloton of fission yield, 1.45 × 10²³, together with the d/s/10⁴ fissions values for the fission products and U²³⁸ then yielded the activity per event in photons/second at specified times. The data obtained are presented in Table 1.1.

Chapter 2 PROCEDURE

2.1 PARTICIPATION

The project participated in Shots Cherokee, Zuni, and Navajo (air, land and water detonations, respectively) and to a limited extent in Shot Tewa (a surface detonation over shallow water). The original intent of the project was to participate in Shots Cherokee, Zuni, and Navajo only. However, since there were four rockets (spare units) remaining at the conclusion of the Navajo event, the decision was made in the field to fire them during Shot Tewa. Forty rockets and radiation transducers with accompanying telemetering gear were used.

Thirty-six rockets were fired for Shots Cherokee, Zuni, and Navajo. Twelve rockets were fired in two salvos of six during these events. The first salvo was fired at 7 minutes and the second at 15 minutes after detonation with 2-second intervals between rockets of each salvo. The four additional rockets were fired during Shot Tewa at 7 minutes after detonation with 10-second intervals between them. For Shots Cherokee, Zuni, Navajo (second salvo), and Tewa, the rockets of a single salvo had different trajectories in a single vertical plane. For Shot Navajo, the six rockets of the first salvo were fired at the same quadrant elevations but at different azimuthal angles. Trajectories were determined before the detonations on the basis of predicted winds. Some rockets were fired so as to pass through the cloud or stem into a radiation-free area while their signals were still being received, so that the contamination of the rocket could be estimated.

2.2 INSTRUMENTATION

Fifty units of an especially developed rocket were produced for this operation. The radiation transducers, likewise, were especially developed. Commercial equipment served as the transmitting and receiving units.

2.2.1 Rockets. Prior to the acceptance of the proposal for this project, there was no single-stage, solid-fuel rocket that could attain an altitude of 100,000 feet when launched from sea level. Design, fabrication, and testing of the rocket was accomplished by Cooper Development Corporation, who also had the responsibility for launching the rockets and recording their data in the field. The result was a $6\frac{1}{2}$ -inch diameter by approximately 12-foot-long rocket capable of attaining a maximum altitude of about 200,000 feet or a maximum range of about 230,000 feet. The radiation detector and telemetering transmitter were located in the ogive (head assembly). Figure 2.1 is a schematic drawing of the rocket.

This rocket, the atmospheric-sounding projectile (ASP), was a ground-launched ballistic missile using a solid fuel. The single-grain propellant consisted of a stabilized ammonium perchlorate oxidizer with a Thiokol base. The single-stage motor had a total impulse of 31,000 lb-sec and a burning time of 5.8 seconds. The burnout velocity of the rocket was approximately 5,400 ft/sec. The prelaunch weight was 245 pounds with a burnout weight of 93 pounds.

Rockets were launched from a simple rail-type launcher employing a zero-tipoff system. Figure 2.2 shows one set of rockets on their launchers at Site How. In this zero-tipoff launching system, as a rocket moves forward, it is supported on the rail by two launching shoes. As the forward shoe leaves the front of the rail, it drops free of the rocket, and the after shoe is sheared off by a block on the launcher rail, permitting the rocket to continue to move parallel to the rail without tipoff error.

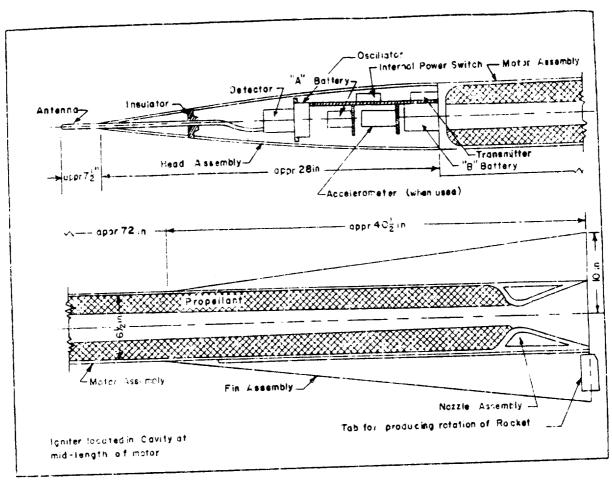


Figure 2.1 Cut-away view of atmospheric sounding projectile (ASP).

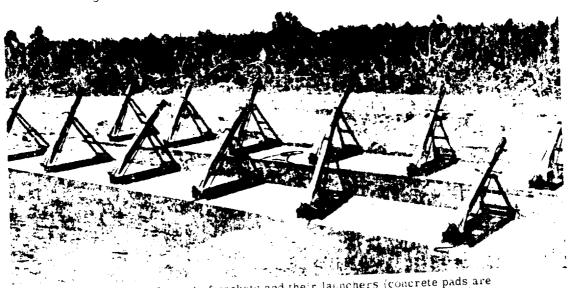


Figure 2.2 One set of rockets and their launchers (concrete pads are 100 feet long by 12 feet wide).

The rockets were caged in position on the launchers during all events until the shock wave passed. In Figure 2.2, all rockets were caged except the one in the lower right-hand corner, on which the caging clamps stand open and are visible just above the supporting A-frame. The cages were closed with explosive bolts, whose detonation by the timer just prior to launching uncaged the rockets.

Nine rockets were expended making preoperational flight tests and obtaining trajectory information. Figure 2.3 is a plot of range versus altitude for various quadrant elevations of launching of the rockets from sea level in a standard (National Advisory Council for Aeronautics) atmosphere. Time marks are indicated on the trajectories. Trajectories were calculated from information gathered at test firings at the Naval Air Missile Test Center, Point Mugu, California, and at White Sands Proving Grounds, New Mexico. Four rounds were fired at Point Mugu and five at White Sands. Of these, eight were fired at a quadrant elevation of $\frac{1}{2}$ radian (28.6 degrees), and one, at an elevation of $\frac{1}{2}$ radians (85.9 degrees). Rockets were tracked by phototheodolites, skin-tracking radar, and velocimeters (doppler radar). The velocimeter and phototheodolites were able to track the rockets to burnout, whereas radar tracked them to impact.

One test rocket was fired in the field in conjunction with the Shot Cherokee dry run to check out the complete system, including the Site How launching station and the Site Nan and USS Knudson receiving stations. The USS Knudson was stationed at a point which was at the same general bearing and range relative to the test rocket trajectory as the planned trajectories for Shot Cherokee. Good signal strength was received at both receiving stations.

2.2.2 Radiation Transducers. The transducer (Figure 2.4), composed of the ionization chamber and the blocking oscillator circuit, was assembled as a single compact unit and mounted in the forward part of the ogive of each rocket. The ion chamber-electrometer devices were capable of measuring gamma radiation at dose rates from at least 10,000 r/hr to less than 10 r/hr with an energy response of 0.1 to 2.0 Mev. The electrometer circuit was designed to operate in a cyclic mode to produce pulses directly proportional to the dose rate. The pulses modulated the telemetering FM transmitter (Ralph M. Parsons Company Model 7501), which supplied 2 or 3 watts to the antenna (a 7½-inch spike protruding from the nose of the rocket).

The ion chamber had the following characteristics:

Type of construction - Parallel-plate guard ringed Gas and pressure - Pure Argon, 15 atmospheres Collecting volume - Nominal 100 cc Maximum radiation rate - 10,000 r/hr Current output - Nominal 10^{-10} amps/r/hr High voltage electrode voltage - 180 volts Number of plates - 4 HV, 3 collecting Collecting-to-HV electrode capacitance - 40 to 50 $\mu\mu$ f Plate spacing - 0.48 cm Beta response - None

The energy response of the chamber alone was not specified, as it was measured as a function of direction over the entire 4π solid angle as installed in the rocket.

The electrometer circuit was the simple blocking oscillator shown in Figure 2.4. Its operation may be briefly traced as follows. If a pulse has just occurred, the grid of the electrometer tube is at a negative potential of 10 to 15 volts with respect to ground and completely cuts off the tube. Ionization caused by gamma radiation incident on the chamber discharges the chamber capacitance; since the ion chamber is completely saturated, the discharge is linear with respect to time. As the grid voltage rises, the tube gradually reaches a critical trigger value, at which time regeneration occurs through the chamber capacitance. The chamber is recharged by grid current as the pulse occurs; when the pulse falls, the grid diode action ceases and the grid resets to the negative cut-off potential. Each pulse out represents a certain increment of dose, so the repetition rate of the pulses is proportional to the dose rate. The nominal pulse-rate of the circuit was 0.2 pps/r/hr, so the upper pulse-rate at 10,000 r/hr was 2 kc and the incrementary of the circuit was 0.2 pps/r/hr, so the upper pulse-rate at 10,000 r/hr was 2 kc and the incrementary of the circuit was 0.2 pps/r/hr.

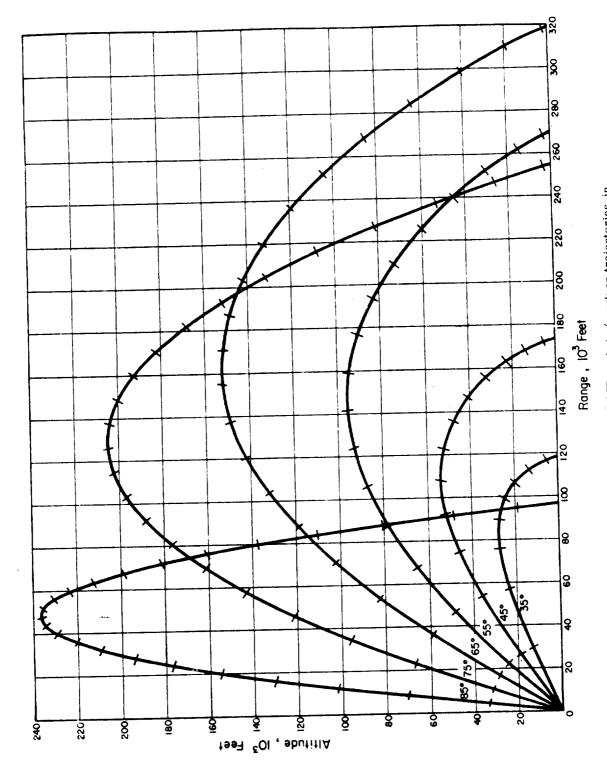
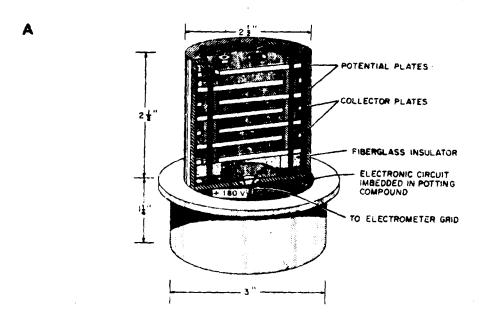


Figure 2.3 Trajectories of ASP rockets (mark on trajectories in 10-second intervals).

tal dose per pulse was nominally 1.4 mr. The upper radiation dose was determined by chamber saturation characteristics; dose rates above 10,000 r/hr may be measured with reduced accuracy by applying appropriate correction factors to the data. The lower limit is set by the vacuum tube grid current and varies somewhat from unit to unit.

The relative polar response of the chamber was determined by using gamma or X-rays of various energies. These data were obtained by operating chambers inside ogives (the forward



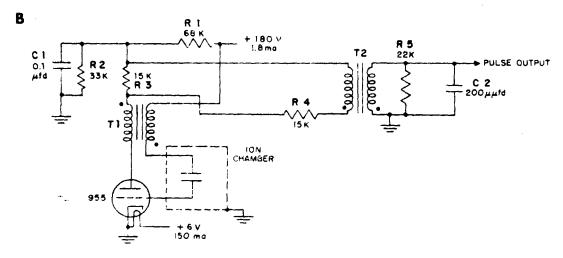


Figure 2.4 Radiation transducer schematic.

element of the rocket containing telemetering equipment) with associated equipment and exposing them to gamma and X-rays of various energies at different polar angles. As shown in Figure 2.5, the low energy response was relatively high along the normal to the vehicle axis. This response was considered desirable to compensate for low energy attenuation in other directions. Integration of the 1.3 Mev curve indicated that the integrated response was 85 percent of that due to a point source producing the same field but located on a line passing through the center of

the chamber and normal to the axis of the chamber. The integrated response over the 4π solid angle was relatively flat as shown in Figure 2.6. From this curve it can be seen that the response of the chamber was independent of energy within ± 10 percent from 90 to 2,000 keV.

The radiation transducers for the rocket flights showed a range of sensitivities of 0.17 to 0.39 pulse/sec/r/hr when calibrated with a 4-curie point source of Co^{60} . As noted above, the sensitivity was reduced by 15 percent when the transducers were operated inside the rocket ogive in a uniformly distributed radioactive field.

2.2.3 Launching Site. A launching revetment was constructed on Site How (10 to 18 miles from the shot points). The revetment consisted of two concrete launching pads, each 100 feet by 12 feet; an embankment to protect the launchers from possible water waves; and an instrument shelter.

Firing of the rockets was controlled by a sequence timer located in the instrument shelter. The timer was armed by a minus 1-second signal provided by an Edgerton, Germeshausen and

Shot		Cherokee *	Zuni	Navajo	Tewa
Site How Launching	Range	92,300 †	76,800 †	55,600 †	73,000 †
Revetment	Bearing	285‡	232 ‡	283 ‡	28 3 ‡

116,000 t

195,000 †

302 I

330 t

70.800 t

165,000 +

261 1

2801

81,000 t

160,000 †

308 t

315 t

97,100 t

200,000 †

304 I

310 ‡

TABLE 2.1 RANGE AND BEARINGS OF SHOT POINTS FROM RECEIVING STATIONS AND LAUNCHING REVETMENT

Range

Range

Bearing

Bearing

Site Nan Receiving

APD 101 Receiving

Station

Station

Grier (EG&G) timing relay. Two blue boxes were arranged so that the timer would also start if one or both of the boxes were triggered by the bomb light. The timer started the local power generators after the blast wave had passed. (The local power generators were left running when the shelter was secured for Shot Cherokee and the shock wave stopped them; therefore, the generators were started by the sequence timer after passage of the shock wave for subsequent shots.) turned on the long-wave transmitter, started the rocket telemeters, uncaged the rockets, ignited the rocket flares, and fired the rockets. Power for all but the long-wave transmitter was supplied by batteries.

The long-wave transmitter, a BC-610 AM transmitter operated at 2.545 Mc, was located at the launching revetment and relayed the launching times of the rockets to telemetering receiving stations.

2.2.4 Receiving Stations. Duplicate receiving stations were set up at Site Nan and aboard the USS Knudson (APD-101). Figure 2.7 shows the position of the receiving stations. Table 2.1 gives the range and bearing of the various ground zero locations from the launching revetment at Site How, the shipboard receiving station, and the Site Nan receiving station.

The two receiving stations were similar except that the one at Site Nan was unmanned at shot time and was equipped with automatic timing equipment to operate the recording devices. The basic equipment of the stations consisted of six Raymond Rosen 842-C FM telemetering receivers, a R-390/Urr AM receiver tuned to 2.545 Mc, and an Ampex Model S 3530 seven-channel tape recorder. Telemetering frequencies of 223, 224, 225, 226, 227, 228, and 239 Mc were assigned, giving six channels and one spare. The six signals from the rocket telemeters were detected and recorded on six of the channels. The launch signals from the BC-610 transmitter at the launching site were recorded on the seventh channel. In addition to the basic information

^{*} Planned Ground Zero.

[†] Range, feet.

[#] Bearing, degrees.

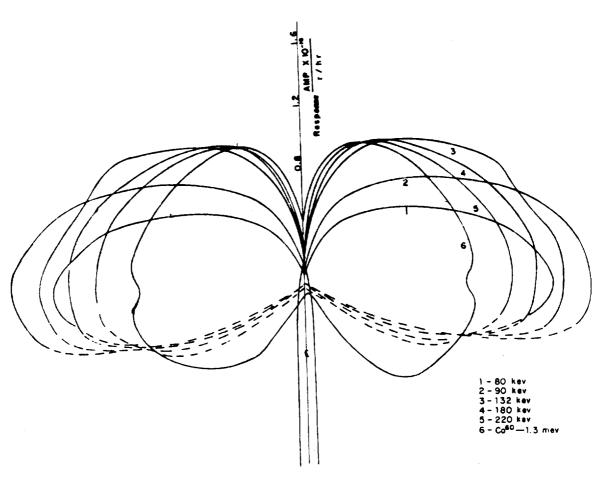


Figure 2.5 Energy and direction response of ASP radiation transducer.

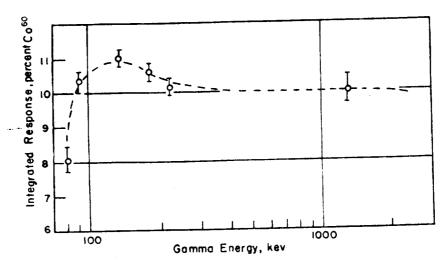


Figure 2.6 ASP radiation transducer energy dependence for uniformly distributed source.



⊙ **;**

S Neutical Miles
Rachel Launching Station

Chereba



for Shot Indicated

Figure 2.7 Location of Project 2.61 activities.

on radiation intensity, the strength of the carrier signal, as received at the shipboard station, was recorded on six channels of an oscillograph.

Automatic readout equipment at the shipboard station was intended to record the six channels of information simultaneously on a logarithmic scale as a function of time. However, the equipment failed prior to the first event, probably due to overheating of components. Repair in the field was impossible since the components were imbedded in potting compound.

2.3 DATA REQUIREMENTS

Data required to meet the objectives of the project consisted of general observations upon the working of the system and radiation intensity measurements as a function of rocket position. Supplementary data were also obtained on telemetering transmitter carrier field strength. The latter data were used as an aid in interpreting the primary data. Radiation intensity information was recorded on magnetic tape, while carrier field strength was recorded on oscillograph paper.

Magnetic tapes containing the primary information were processed by Cooper Development Corporation at Monrovia, California. Simultaneous readout of six channels of information on the magnetic tapes was accomplished utilizing a six-channel discriminator capable of sorting out data in the presence of a high noise background. With the information thus obtained together with field strength records from the shipboard station, the rocket transmitters were identified with specific channels at a given time. The reduced data were presented in the form of radiation-intensity readings as a function of time after launching.

Chapter 3 RESULTS

3.1 GENERAL PERFORMANCE OF THE SYSTEM

During Shot Cherokee all rockets fired and good (data, pulses could be heard well with no noise background) signal strength was received on all channels. The blast wave stopped two generators at the launching station, causing loss of the rocket-launch signals. However, data from later firings provided sufficient information for computing the launch times. In spite of relatively high radiation fields $(3 \times 10^4 \text{ r/hr})$ no serious attenuation of the telemetering signal was noted. There were no data on channels corresponding with rockets shot at the stem. It is probable that these projectiles missed the stem.

All rockets fired during Shot Zuni, and good signal strength was received on all channels. Radiation fields that were measured were lower than those encountered during Shot Cherokee. Channels corresponding to rockets aimed at the lowest elevations had no data on the carriers.

All Shot Navajo rockets fired, and good signal strength was received on 10 of the 12 channels. Radiation fields measured were lower than those previously encountered. Channels corresponding to rockets aimed at the stem indicated low activity there.

Four spare rockets were instrumented and prepared for launching during Shot Tewa. All fired, and good signal strength was received on three of the four channels. One transmitter failed shortly (about 5 seconds) after takeoff, and one transmitter was considerably off frequency. Accelerometers were used on two of the rockets. Useful radiological intensity information was received from only rocket (Round 3).

In all events, instability in the transmitter-receiver portion of the telemetering system caused receivers to pick up rocket transmitters other than those assigned; also, there were cases of receivers changing from one rocket transmitter to another during a particular salvo.

3.2 TELEMETERED INFORMATION

Tables 3.1, 3.2, 3.3, and 3.4 summarize launch conditions for Shots Cherokee, Zuni, Navajo, and Tewa. The column headed Azimuth gives the azimuthal settings of the launchers with respect to ground zero stations.

Figures 3.1 and 3.2 give roentgen intensity versus time information that is typical of the various shots. Tables 3.5 through 3.8 summarize all the information from telemetering channels upon which there were data for Shots Cherokee, Zuni, Navajo, and Tewa. These tables show only the information for the more reliable early portions of the trajectories, where the accuracy of the trajectory information was estimated by the contractor to be within \pm 10 percent. In all cases zero time is the time of launch of the rocket. Sketches of the clouds with rocket trajectories are presented in Figures 4.2 through 4.6 in Chapter 4.

Rockets fired at the stem of the Shot Navajo cloud yielded no data although the rocket transmitters and transducers appeared to be operating normally.

Contamination of the rocket surfaces was not serious. Table 3.9 indicates in terms of percentages of peak readings the contamination of rockets for which the telemetered record was long enough for contamination determinations to be made. Four rockets had residual readings

TABLE 3.1 SUMMARY OF LAUNCH CONDITIONS FOR SHOT CHEROKEE

		Quadrant	Launching
Rocket	Azimuth.	Elevation	Time
		degrees	min:sec
1.4	CZ	36	H + 7:00
2A	25	43	H + 7:02
. ¥	ZD	53	H + 7:04
44	ZD	65	H + 7:06
. Y	CZ	75	H + 7:08
6A	25	82	H + 7:10
18	25	35	H + 15:00
2.18	GZ + 25 deg right	44	H + 15:02
3. 12	GZ + 25 deg right	55	H + 15:04
4B	+ 25 deg	65	H + 15:06
5.8	GZ + 25 deg right	7.5	H + 15:08
6B	GZ + 25 deg right	38	H + 15:10

*GZ is ground zero predicted for Shot Cherokee.

TABLE 3.3 SUMMARY OF LAUNCH CONDITIONS FOR SHOT NAVAJO

Azimuth GZ + 3 deg left GZ + 2 ½ deg r	Azimuth	_	Quadrant	Time
2 + 3			Elevation	21111
2 + 3			degrees	min:sec
7 7 7 2	der l	ıja	35	H + 7:00
	1, de	g right	35	H + 7:02
2 + 6	deg	right	35	H + 7:04
2 + 9	1, de	g right	35	H + 7:06
2 + 1	5 deg	right	35	H + 7:08
GZ + 2	0 deg	right	35	H + 7:10
Z + 2	0 deg	right	55	H + 15:00
GZ + 2	.0 deg	right	65	H + 15:02
GZ + 2	20 deg	right	85	H + 15:04
GZ + 2	20 deg	right	55	H + 15:00
GZ + 2	20 deg	right	65	H + 15:08
GZ + 2	20 deg	right	85	H + 15:10
	GGZ + 6 GGZ + 1 GGZ + 2 GGZ + 2	2 + 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6	GZ + 6 deg right GZ + 9 ½ deg right GZ + 15 deg right GZ + 20 deg right	

TABLE 3.2 SUMMARY OF LAUNCH CONDITIONS FOR SHOT ZUNI

	1	Quadrant	Launching
Rocket	Azimuth	Elevation	Time
		degrees	min:sec
Y	Z5	31	H + 7:00
5 ₽	CZ	35	H + 7:02
34	CZ	45	H + 7:04
4	CZ	55	H + 7:06
5.A	25	65	H → 7:08
6A	CZ	82	H · 7:10
13	CZ	31	H + 15:00
2B	CZ	45	H + 15:02
33	ZS	55	H + 15:04
£B	ZĐ	65	H + 15:06
5B	CZ	75	H + 15:08
6B	ZS	85	H + 15:10

TABLE 3.4 SUMMARY OF LAUNCH CONDITIONS FOR SHOT TEWA

Launching Time	min:sec	H + 7:00	H + 7:10	H + 7:20	H + 7:30
Quadrant Elevation	degrees	20	65	75	85
Azimuth		ZD	25	ZĐ	ZD
Rocket		1A *	2 A	3A	4A *

* Accelerometer rounds.

TABLE 3.5 SUMMARY OF INFORMATION TELEMETERED FROM VARIOUS ROCKETS DURING SHOT CHEROKEE

TABLE 3.6 SUMMARY OF INFORMATION TELEMETERED FROM VARIOUS ROCKETS DURING SHOT ZUNI

After Rocket Rocket Hocket Hoc		Rocket 2A 33 33 86 66 1115 1115 128 725 725 33.130	3A 3A 573 895 1,968 4,294 8,736 113,300 118,860 24,380 22,380 28,320 29,320	Rocket 4A	Kocket 5A	HOCKEI 6A	2B	4B	6.8	.3	
2A 3A 4A 5A 6A 2B 4B 6B 2A 3A 4A 5A 6A 2B 4B 6B 2A 3B 42B 42B 33 336 83 175 2A 13B 42B 42B 33 836 83 175 13B 42B 22560 1371 164 28B 818 360 115 186 12,166 1,571 164 287 360 173 360 115 1860 20,280 2,887 281 1,36 286 188 195 188 196 170 1,36 235 235 215 235 215 215 235 216 225 </th <th></th> <th>2A 33 66 1115 181 229 429 728 1,140 3,130</th> <th>573 895 1,968 4,294 8,736 13,300 18,660 24,380 28,280 28,280</th> <th>\$</th> <th>24</th> <th>6A</th> <th>218</th> <th>4</th> <th>68</th> <th>3</th> <th></th>		2A 33 66 1115 181 229 429 728 1,140 3,130	573 895 1,968 4,294 8,736 13,300 18,660 24,380 28,280 28,280	\$	24	6 A	218	4	68	3	
186	20 20 20 20 20 20 20 20 20 20 20 20 20 2	53 66 66 1115 181 229 429 429 1,140 3,130	573 895 1,968 4,294 8,736 13,300 18,660 24,380 28,280 28,280 28,280	1						1	
100	115 115 116 117 118 117 118 117 118 117 118 118 118	33 66 66 1115 1181 2297 429 725 11,140 3,130	573 895 1,968 4,294 8,736 13,300 18,660 24,380 28,280 28,320								Ì
573 2,315 879 428 33 336 83 1 85 5,215 807 72 993 175 1 1,968 12,166 1,971 164 292 8,164 360 1 1,968 12,166 1,971 164 292 8,164 360 1 4,294 22,640 2,570 219 571 7,316 366 1 18 8,736 29,460 2,864 264 1,196 2,772 316 1 18 18 30 22,840 2,511 385 9,568 818 195 2 29 18,00 2,840 2,511 385 9,568 818 195 29 29 11,00 2,666 406 12,040 1,668 406 12,040 1,668 112 112 12,040 1,668 11,040 1,668 11,040 1,774 11,06 2,722	114 116 117 118 119 119 119 119 119 119 119 119 119	33 66 1115 1115 1297 429 725 725 1,140 3,130	573 895 1,968 4,294 4,294 8,736 113,300 18,860 24,380 28,280		168	I	!	100	!		Ξ
573 2,315 807 72 993 175 895 5,672 1,380 112 2,872 2,878 2,878 4,284 12,166 1,371 164 292 2,878 2,878 66 13,300 33,160 2,872 321 3,024 1,692 275 115 18,860 30,280 2,871 381 1,95 2,732 316 297 24,380 2,811 389 11,180 564 170 235 297 28,280 2,811 389 11,180 564 170 225 297 28,280 2,511 385 399 11,180 564 170 297 28,280 1,607 410 10,136 369 130 275 280 280 11,20 280 280 11,20 280 280 112 280 280 280 11,20 280 280 280 280 280<	15 11 11 11 11 11 11 12 13 13 13 13 13 13 13 13 13 13 13 13 13	66 66 1115 1115 1297 429 725 725 1,140 3,130	573 895 1,968 4,294 8,736 13,300 18,860 24,380 28,280	879	428	33	I	336	83		13
855 5,672 1,380 112 2,878 288 1,968 12,166 1,971 164 292 8,164 360 33 8,736 28,460 2,870 219 571 7,316 366 115 8,800 32,160 2,872 316 1,968 1,968 116 115 8,336 22,460 2,872 316 1,196 2,725 316 115 181 24,380 22,440 2,511 385 9,68 818 195 297 28,280 16,000 2,284 2,511 386 322 170 429 29,320 11,800 2,066 406 1,204 463 130 1,470 12,960 6,180 1,480 397 5,902 280 99 1,480 9,398 5,112 1,332 3,984 242 61 1,490 8,998 5,112 1,323 349 5,902	118 118 119 119 120 120 120 130 130 130 130 130 130 130 130 130 13	33 66 1115 1181 1297 429 728 728 1,140 1,870 3,130	895 1,968 4,294 8,736 13,300 18,660 24,380 28,280	2 315	807	72	ļ	993	175		2
1,968 12,166 1,971 164 292 8,164 360 14,24 22,640 2,570 219 571 7,316 366 13,300 33,160 2,872 321 3,024 1,592 275 115 18,660 20,260 2,712 361 6,120 1,965 235 118 18,660 20,260 2,712 361 6,120 1,965 235 1,130 29,320 11,900 2,738 399 11,180 564 170 2,252 26,000 9,380 1,807 4,100 2,904 2,132 3,902 280 399 1,130 2,904 1,307 2,905 2,906 1,807 4,100 2,904 2,132 3,902 280 399 3,130 3,908 5,112 1,522 3,902 280 399 3,906 2,909 2,909 2,132 1,223 378 4,766 2,20 2,909 2,132 1,522 3,904 2	119 2 2 2 2 2 2 2 2 3 3 4 4 4 4 4 4 4 4 4 4	33 66 1115 1115 1297 429 729 728 1,140 1,870 3,130	1,968 4,294 8,736 13,300 18,660 24,380 28,280	5 672	1.380	112	1	2,878	288		Ξ
33 8,736 22,640 2,570 219 571 7,316 366 33 8,736 22,640 2,570 219 571 7,316 266 115 18,660 33,160 2,872 321 3024 1,692 275 116 12,300 33,160 2,872 321 3024 1,692 275 111 18,660 30,280 2,712 361 1,696 2,64 170 297 22,320 11,900 2,086 406 12,040 483 139 1,140 19,040 7,456 1,672 406 7,292 322 112 1,140 19,040 7,456 1,672 406 7,292 322 112 1,140 19,040 7,456 1,670 2,902 280 969 376 399 1,129 302 280 12 10 1,136 376 4,766 1,292 322 112 4,766 <td>118 120 120 120 120 130 130 130 130 130 130 130 130 130 13</td> <td>33 66 1115 1181 297 429 725 1,140 1,870 3,130</td> <td>1,500 4,294 8,736 13,300 18,860 24,380 28,280 29,320</td> <td>19.164</td> <td>1 971</td> <td>164</td> <td>292</td> <td>8.164</td> <td>360</td> <td></td> <td>15</td>	118 120 120 120 120 130 130 130 130 130 130 130 130 130 13	33 66 1115 1181 297 429 725 1,140 1,870 3,130	1,500 4,294 8,736 13,300 18,860 24,380 28,280 29,320	19.164	1 971	164	292	8.164	360		15
33 8,736 29,460 2,644 1,196 2,732 316 115 18,100 39,160 2,872 321 3,024 1,692 275 115 18,160 39,120 2,872 321 3,024 1,692 275 116 18,160 2,872 321 3,968 818 195 227 22,220 11,300 2,238 399 11,30 544 139 725 22,000 9,380 1,807 410 10,136 360 125 1,170 12,960 6,100 1,480 397 5,902 280 39 1,180 12,968 5,112 1,522 406 7,222 360 360 125 1,180 1,272 406 1,722 300 1,280 36 476 477 242 280 36 476 477 477 477 477 477 477 477 477 477 <t< td=""><td>1</td><td>33 66 115 181 297 429 725 1,140 1,870 3,130</td><td>8,736 13,300 18,860 24,380 28,280</td><td>22 640</td><td>2.570</td><td>219</td><td>571</td><td>7,316</td><td>366</td><td></td><td>16</td></t<>	1	33 66 115 181 297 429 725 1,140 1,870 3,130	8,736 13,300 18,860 24,380 28,280	22 640	2.570	219	571	7,316	366		16
33 8,735 28,460 2,864 2,64 1,195 2,135 2,135 2,136 2,137 3,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 2,136 1,136 3,139 3,146 3,292 2,96 3,984 2,42 60 4,436 3,234 3,234 3,234 3,234 3,234 3,234 3,234 3,234 3,234 3,234 3,234 3,246 4,64 4,64 4,64 4,64 3,336 2,046 6,06 3,346	20 20 20 20 20 20 20 20 20 20 20 20 20 2	33 66 115 181 297 429 725 1,140 1,870 3,130	8,736 13,300 18,860 24,380 28,280 29,320		•		•	Č	910		1.7
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115 18,650 30,280 2,712 361 6,120 1,036 2.33 297 28,280 12,840 2,531 385 9,568 818 195 429 28,280 11,900 2,038 319 11,100 544 170 725 26,000 9,380 1,807 410 10,136 360 125 1,870 12,960 6,160 1,807 410 10,129 322 112 4,560 8,024 4,366 1,823 378 4,476 242 14 4,550 8,024 4,366 1,223 378 4,476 242 51 4,550 6,366 3,830 1,102 365 3,984 242 61 4,556 4,694 2,724 805 3,566 242 60 4,556 4,694 2,724 805 3,984 2,704 168 44 4,556 4,694 2,724 805 3,984 1,70 168 44 4,556 4,694 2,724 805 3,94 2,700 168 44 4,556 4,694 2,724 805 3,94 2,700 168 44 4,556 4,694 2,724 805 3,94 2,700 168 44 4,556 4,694 1,724 585 2,074 119 5,344 2,294 1,724 585 2,074 119 2,344 2,294 1,724 585 2,074 119 2,344 2,294 1,724 585 2,074 119 2,346 1,546 1,208 1,450 1,964 1,358 81 2,224 1,610 1,044 1,348 81 2,478 1,586 992 1,119 1,192 81 2,748 1,586 992 1,119 1,192 81 2,748 1,586 994 1,196 1,196 1,196 1,196 3,346 1,358 976 1,190 1,190 1,190 3,346 1,358 976 1,010 81 3,346 1,358 976 1,010 81 3,346 1,358 976 1,010 81 3,346 1,358 976 1,010 81 3,346 1,358 976 1,010 81 3,346 1,358 976 1,010 81 3,346 1,358 976 1,010 967 1,010 3,360 1,077 986 1,010 967 1,010 3,360 1,077 986 1,010 967 1,010 3,346 1,358 976 1,010 967 1,010 3,360 1,077 986 1,010 967 1,010 3,360 1,077 986 1,010 1,010 3,360 1,077 986 1,010 1,010 4,488 1,489 976 1,010 1,010 4,488 1,489 976 1,010 1,010 4,489 1,480 1,010 1,010 4,480 1,480 1,010 1,010 5,478 1,480 1,480 1,480 1,480 1,480 5,478 1,480 1	22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	115 181 297 429 725 1,140 1,870 3,130	18,860 24,380 28,280 29,320	33,160	2,872	321	3,024	1,692	C1.2		2
181 24,380 22,840 2,511 385 9,968 818 195 297 28,280 16,000 2,238 399 11,180 564 170 725 26,000 9,380 1,807 410 10,136 360 125 1,870 12,960 6,146 1,480 340 5,020 280 86 1,870 12,960 6,146 1,480 340 5,060 280 86 4,560 8,024 4,366 1,223 378 4,476 242 73 4,560 8,024 4,366 1,223 378 4,476 242 73 4,560 8,024 4,366 1,102 365 3,984 242 61 4,560 8,024 4,366 1,102 365 3,984 242 61 4,560 8,024 4,366 1,102 365 3,244 2,24 61 4,560 8,406 2,322	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	181 297 429 725 1,140 1,870 3,130	24,380 28,280 29,320	30,280	2,712	361	6,120	1,056	233		5
297 28,280 16,000 2,238 399 11,180 564 170 429 29,320 11,900 2,066 406 12,040 483 139 725 28,000 9,380 1,807 410 10,136 360 125 1,140 19,040 7,456 1,672 406 7,292 322 112 1,870 12,960 6,180 1,480 397 5,902 280 99 1,870 12,964 6,180 1,102 365 3,984 242 61 4,560 8,024 4,366 1,123 348 4,476 242 71 4,952 6,386 3,322 399 350 3,586 242 60 4,560 8,024 4,589 902 334 3,224 204 46 4,580 4,038 2,724 805 318 2,914 204 46 4,438 3,682 2,302 759 301 2,700 168 44 4,438 3,682 2,302 759 301 2,700 168 44 4,440 3,336 2,044 867 2,204 119 7 2,344 2,294 1,724 585 2,074 119 7 2,344 2,294 1,724 585 2,074 119 7 2,344 2,294 1,420 7 1,984 119 7 2,344 2,294 1,420 7 1,984 119 7 2,344 1,594 1,400 967 1,420 1,984 119 7 2,344 2,224 1,610 1,044 7 1,92 81 7 2,478 1,598 1,890 999 700 1,192 81 7 2,478 1,598 1,830 904 1,000 81 7 2,478 1,538 878 7 1,010 81 7 2,478 1,538 878 7 1,010 81 7 2,478 1,338 878 7 1,010 81 7 2,448 1,358 878 7 1,010 81 7 2,448 1,358 878 7 1,010 81 7 2,448 1,358 878 7 1,010 81 7 2,448 1,358 878 7 1,010	22 22 23 23 24 43 44 45	297 429 725 1,140 1,870 3,130	28,280	22,840	2,511	382	896'6	818	195		3
429 29,320 11,900 2,066 406 12,040 463 139 725 26,000 9,300 1,807 410 10,136 360 125 1,140 19,040 7,456 1,672 406 7,292 322 112 1,870 12,960 6,180 1,480 397 5,902 280 99 3,130 9,998 5,112 1,352 349 5,060 280 86 3,130 9,998 5,112 1,352 349 5,060 280 86 4,560 8,024 4,366 1,223 378 4,476 242 61 4,550 4,038 2,724 805 3,34 2,94 204 46 4,438 3,682 2,302 759 301 2,700 168 44 4,438 3,682 2,302 759 301 2,700 168 44 4,438 3,682 2,302 759 301 2,700 168 44 4,438 1,860 1,894 667 2,204 119 7 2,344 2,294 1,724 585 2,074 119 7 2,344 2,294 1,724 585 1,969 119 7 2,344 2,294 1,724 585 1,969 119 7 2,346 1,596 1,402 1,969 1,999 1,592 81 2,224 1,596 1,402 1,694 119 7 2,340 1,899 1,800 1,400 1,404 1,594 119 7 2,224 1,610 1,044 1,598 81 1,454 81 1,594 1,900 81 1,454 81 1,594 1,900 81 1,400	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	429 725 1,140 1,870 3,130	29,320	16,000	2,238	399	11,180	264	170		21
725 26,000 9,360 1,807 410 10,136 360 125 1,140 19,040 7,456 1,672 406 7,292 322 112 1,870 12,960 6,160 1,480 397 5,902 280 99 3,130 9,998 5,112 1,352 389 5,060 280 86 4,560 8,024 4,366 1,223 378 4,476 242 73 4,560 8,024 4,366 1,102 365 3,984 242 61 4,560 6,366 3,830 1,102 365 3,984 242 61 4,564 4,694 2,869 902 334 3,24 204 46 4,564 4,694 2,869 902 334 3,24 204 46 4,564 4,694 2,869 902 334 2,24 204 46 4,140 3,336 2,902 <td< td=""><td>2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2</td><td>725 1,140 1,870 3,130</td><td></td><td>11,900</td><td>2,066</td><td>406</td><td>12,040</td><td>483</td><td>135</td><td></td><td>22</td></td<>	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	725 1,140 1,870 3,130		11,900	2,066	406	12,040	483	135		22
1,140 19,040 3,550 1,100 7,292 322 112 1,140 19,040 7,456 1,467 406 7,292 322 112 1,870 12,960 6,160 1,465 1,523 349 5,060 280 86 4,560 8,024 4,366 1,223 378 4,476 242 73 4,560 8,024 4,366 1,102 365 3,984 242 61 4,560 8,024 4,366 1,102 365 3,984 242 61 4,564 4,694 2,868 902 334 3,224 204 46 4,564 4,694 2,868 902 334 3,224 204 46 4,564 4,036 2,724 805 318 2,914 204 46 4,564 4,140 3,336 2,064 680 2,146 168 44 4,140 3,336 2,904	28 22 28 29 29 29 29 29 29 29 29 29 29 29 29 29	725 1,140 1,870 3,130		1	1 000	710	10 136	360	125		23
1,140 19,040 1,530 1,012 280 99 3,130 9,998 5,112 1,352 389 5,060 280 86 3,130 8,024 4,366 1,223 378 4,476 242 73 4,560 8,024 4,366 1,223 378 4,476 242 61 4,564 4,694 2,868 902 334 3,224 204 58 4,564 4,694 2,868 902 334 3,224 204 58 4,554 4,038 2,724 805 318 2,914 204 46 4,438 3,682 2,302 759 301 2,700 168 44 4,438 3,682 2,302 759 301 2,700 168 44 4,438 3,682 2,302 759 301 2,700 168 44 4,438 3,682 2,302 759 301 2,700 168 44 2,344 1,960 1,422 530 1,964 119 7 2,344 1,594 1,724 585 7,964 119 7 2,344 1,596 1,462 7 1,694 119 7 2,340 1,690 1,420 7 1,694 119 7 2,341 1,596 1,400 7 1,694 119 7 2,378 1,596 1,940 7 1,928 81 7 2,478 1,286 932 1,118 81 7 2,478 1,286 932 1,118 81 7 2,478 1,389 949 7 1,010 81 7 3,360 1,077 848 7 1,010 81 7 3,360 1,077 848 7 1,010	22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1,140 1,870 3,130	2000		0001	907	4 9 9 9	322	112		7
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3,130 9,998 5,112 1,352 389 5,100 200 300 4,560 8,024 4,366 1,223 378 4,476 242 73 4,560 8,024 2,386 1,203 356 2,384 242 61 4,76 4,476 242 61 4,76 4,476 242 61 4,76 4,564 2,384 2,326 3,566 242 60 534 2,24 20 3,24 2,944 2,704 680 2,944 2,944 667 2,230 123 2,944 1,724 585 2,074 119 2,344 2,294 1,724 585 2,074 119 2,344 2,294 1,724 585 2,074 119 2,344 2,294 1,724 585 2,074 119 2,344 1,360 1,462 1,969 119 2,294 1,724 585 2,074 119 2,294 1,420 1,462 1,969 119 2,294 1,420 1,462	28 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	3,130	12,960	6,160	1,480		100	9 6	e de		č
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	n ç	3.360		848	1	1	962		1		•

120 1109 1109 89 80 80 80 80 80 80 80 1,185 785 582 582 471 379 314 235 201 183 167 127 120 1,303 2,187 3,617 4,604 3,952 2,215 Rocket 208 430 761 **4**B 480 444 409 381 350 350 310 293 283 3,482 3,666 3,745 3,745 2,870 1,930 1,450 1,215 1,005 859 756 **684** 618 551 515 504 608 659 845 11,130 11,402 11,760 2,237 2,670 3,178 Rocket 33 Radiation Intensity, r/hr Rocket Rocket 4,686 4,460 4,172 3,798 4,531 4,510 4,534 4,622 4,724 2,984 3,274 3,687 4,094 4,414 1,536 1,872 2,182 2,446 2,714 2B 338 310 231 278 260 604 741 710 678 647 615 58 557 540 525 494 463 415 414 382 368 360 350 Rocket Ϋ́ 1,258 1,054 914 786 706 556 500 446 404 5,115 3,360 2,545 1,965 1,560 Rocket 8,300 11,600 112,740 11,063 8,030 149 450 1,120 2,200 4,615 11111 \$ 3,141 3,225 3,335 3,435 3,680 3,940 3,714 3,449 3,302 3,186 4,292 4,060 3,825 3,580 3,335 4,336 4,200 4,176 4,130 4,266 6,468 6,304 6,099 5,472 4,787 6,449 6,525 7,165 6,824 6,320 Rocket 3A 46 43 49 50 2 B + 10 9 F 8 8 9 9 7 7 7 7 1

TABLE 3.7 SCMMARY OF INFORMATION TELEMETERED FROM VARIOUS ROCKETS DURING SHOT NAVAJO

21 9 20 55 36 30 50 </th <th>Rocket Rocket Rocket Rocket Rocket Aoc 2A 1B 2B 5</th>	Rocket Rocket Rocket Rocket Rocket Aoc 2A 1B 2B 5
69 1121 229 33 408 699 619 619 619 619 619 619 619	
121 38 229 3 3 408 22 408 24 408 24 408 24 408 25 6 624 402 300 624 624 624 625 624 625 624 625 624 625 624 625 624 625 624 625 625 625 625 625 625 625 625 625 625	
229 229 408 614 741 741 741 741 741 741 741 741 741 7	1
408 22 614 11 741 62 624 624 624 624 624 624 700 226 700 226 7	1
614 624 624 624 627 300 228 624 624 627 628 628 629 629 621 621 621 621 622 623 624 624 627 628 628 629 629 629 629 629 629 629 629	ı
741 689 609 609 609 609 609 609 609 60	!
689 402 200 200 229 229 229 229 233 333 333 333	
402 402 300 300 229 229 229 221 221 233 333 333 333 333 333	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	199
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	74 297
2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	46 555
	730
	45 853
	44 1,010
	44 1,180
	43 1,270
	43 1,410
	42 1,580
	42 1,720
	08/1 89
	42 1.450
	-
	1,190
	010'1
	930
	832
	130
53 52 44 43 42 39	- 620
52 4.4 4.3 4.2 3.9	574
4.3	493
43	469
39	416
30	396
	376

TABLE 3.9 ROCKET CONTAMINATION FROM VARIOUS SHOTS

		Peak.	Residual,	Percentage
Shot	Rocket	r/hr	r/br	Dased on Peak
		900	•	0.0
Cherokee	5 :		. 600	2.0
	×	30.05	7	
	\$	33,800	<u>§</u>	9 :
	₹5	2.950	230	7.8
	\$	434	110	25.4 *
	82	12.800	174	6.0
	9	10.300	81	6. 8
	9	386	61	15.7
1111	Ş	7.510	Ţ	0.5
	;	12,800	19	0.5
	ď	3 780	38	6.0
	.	4,820	\$	9.0
9	Ħ,	740	28	8.6
of ware	1 4	1.820	88	3.2
	. eg	146	%	₩.
	·	2 900	208	1.2 •

^{*} Data from these rockets were corrected for contamination.

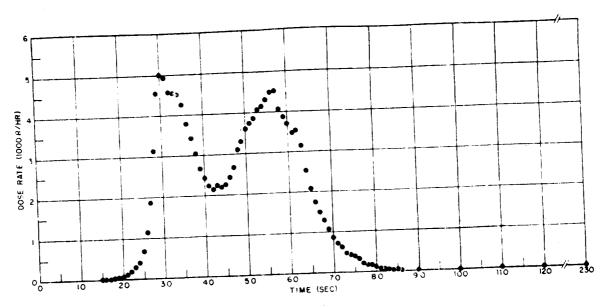


Figure 3.1 Typical roentgen information versus time plot for Shot Cherokee, Round 2A.

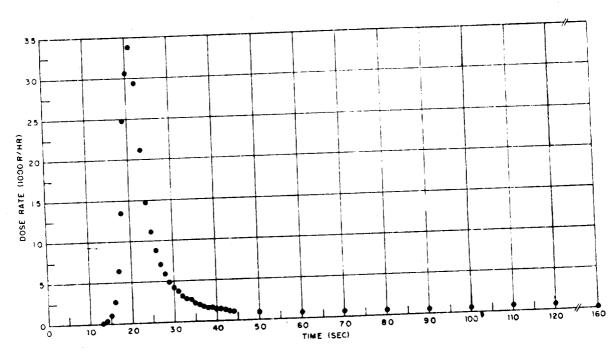


Figure 3.2 Typical roentgen information versus time plot for Shot Cherokee, Round 4A.

in excess of 6 percent of the peak readings. The data from these rockets were corrected by subtracting the quantity

$$\int_{\frac{0}{t}}^{t} r dt$$

$$\int_{R}^{t} r dt$$

from the rocket readings, where t = the time after the start (rocket enters cloud) of the rise of the record, $\hat{\mathbf{f}}$ = reading of the rocket at time t, R = residual reading due to contamination of the rocket, and \mathbf{t}_R = the time at which the readings are down to R.

Chapter 4 DISCUSSION

4.1 GENERAL OPERATION OF THE SYSTEM

At the onset of this experiment, great concern was expressed about the ability of the telemetering system to transmit information out of the highly ionized air expected to be encountered. One theoretical calculation indicated that the 1 watt of power radiated from the rocket antenna would be attenuated to the extent that information carried by it would be below the noise level when received. Another calculation indicated the opposite. Both calculations were sensitive to small changes in the parameters assumed. Fields as high as $3 \times 10^4 \text{ r/hr}$ were encountered with no apparent loss of information. Thus, this concern for the ability of the system to transmit through the highly ionized air seems unfounded.

The system as a whole was made up of commercially available components, (the telemetering transmitters and receivers and the tape recorders) and newly developed experimental components (the rockets and radiation transducers). In general, the performance of the rockets, transducers, and tape recorders may be characterized as satisfactory; that of the transmitters and receivers was less than satisfactory in this particular, unusually rigorous service.

The only difficulties experienced in the field with the transducers could be attributed to faulty packaging. Several transducers failed before they were installed in the rocket heads, probably because the compound in which the electronic components were potted shrunk and cracked the tubes. However, calibrating and testing the detectors before installing them in the rockets insured reliable units.

Drift of the frequency of the transmitters necessitated operating the receivers with their automatic frequency-control circuits turned on so that the receivers might follow the changing frequencies of the transmitters. As a result, two or three receivers occasionally locked on the same transmitter and duplicated the information. On other occasions, receivers changed from one transmitter to another during flight. These effects were due to the fact that a given carrier from one rocket could take control of two or more receivers when their automatic frequency controls were not locked onto a carrier. This capture of control could occur either during the launching period, before all the carriers were on the air, or during the flight period, generally as a result of a strong disturbance in the carrier previously controlling the receiver.

A warm-up time of 12 hours or more was required to reduce appreciable drift in receiver frequency. As mentioned in Chapter 2, the Site Nan receiving station was unmanned during the shot. Since it was necessary to leave this station about 12 hours before shot time, its receiving equipment had to be turned on 24 hours before each shot.

4.2 ACTIVITY IN THE CLOUD

To obtain a measure of the amount of gamma emitters in the cloud, it was necessary to convert roentgen intensity readings to curies of gamma emitters per unit volume. The roentgen activity at a given place in the clouds depends upon the number of photons being emitted per unit time per unit volume, the energy of the photons, and the density of the medium (function of altitude).

The number of Mev per cubic meter per second produced in air containing C curies (In this treatment, it is arbitrarily assumed that there is one photon per disintegration, so a curie is to be taken to mean 3.7×10^{10} photons per second throughout the chapter.) of gamma emitters per cubic meter of an average effective energy of E Mev is 3.7×10^{10} C E Mev/sec/m³. If this

body of air is infinite in extent and in equilibrium, then the energy emitted per unit volume must be equal to the energy absorbed per unit volume. If this air is a standard atmosphere, then the definition of the roentgen leads to the relation, $1 \text{ r} = 6.77 \times 10^4 \text{ MeV/cm}^3$ from which $3.7 \times 10^{10} \text{ C} = \text{MeV/sec/m}^3$ being absorbed yields a field of 1,970 C E r/hr in a standard atmosphere. If a medium has the same absorption and scattering coefficients per gram as the standard atmosphere, then the roentgen field is inversely proportional to density and is given by

$$I = 1,970 \text{ C E } \frac{\rho \text{ standard air}}{\rho \text{ medium}}$$

$$I = 2.54 \frac{\text{C E}}{\rho}$$
(4.1)

where I is the intensity in r/hr inside of an infinite medium of homogeneously mixed emitters, E is the average effective energy of the photons in Mev, C is the number of curies per cubic meter and ρ is the density of the medium in grams per cubic centimeter.

or

Figure 4.1 is a plot of the number of millicuries per cubic meter required to give a field of 1 r/hr versus altitude. This plot was obtained from Equation 4.1 in which the value for the

TABLE 4.1 COMPARISON OF THEORETICAL AND EXPERIMENTAL ESTIMATES OF CLOUD ACTIVITY

Source	Total Photons per Second			
	Cherokee	Zuni	Navajo	
		7 minute		
From cloud profiles	24.5 × 10 ²²	5.6 × 10 ²²		
Theoretical $\begin{cases} fiss. prod. \\ U^{239} * \end{cases}$	$29.3 \times 10^{22} \\ 4.7 \times 16^{27}$	$7.69 \times 10^{22} \\ 1.07 \times 10^{22}$	$3.69 \times 10^{22} \\ 0.13 \times 10^{22}$	
		15 minute		
From cloud profiles	11.0×10^{22}	3.7 × 10 ²²	0.68×10^{22}	
Theoretical $\begin{cases} \text{fiss. prod.} \\ U^{239} \end{cases}$	$14.8 \times 10^{22} \\ 3.7 \times 10^{22}$	3.92×10^{22} 0.84×10^{22}	1.89×10^{22} 0.12×10^{22}	

^{*}Activity due to the 0.07 Mev gamma from U²³⁹ is on the borderline for detection by the radiation transducer, and therefore the bulk of activity recorded arises from fission products.

energy was assumed to be 1.25 Mev and those for the densities were taken from Reference 6. From Figure 4.1 it is evident that altitude is an important consideration in interpreting the information telemetered by rockets.

The telemetered information tabulated in Appendix A is converted to millicuries per cubic meter as a function of range and altitude of the rocket by the use of Figure 4.1 and computed trajectories. Figures 4.2 through 4.6 were prepared from this information by plotting rocket trajectories and drawing contour lines through points of equal activity concentration, thus giving activity profiles through the clouds in the plane of the rocket trajectories. Since the usable parts of the trajectories were mostly through the portions of the clouds between the rocket launching point and ground zero, only this half of the profile is sketched. Figures 4.2 and 4.3 give the semiprofiles for Shot Cherokee at 7 and 15 minutes after detonation; Figures 4.4 and 4.5 give the semiprofiles for Shot Zuni at 7 and 15 minutes after detonation; and, Figure 4.6 gives the semiprofile for Shot Navajo at 15 minutes after detonation. The wind profile in the plane of the rocket trajectories has been computed and is shown on the 15-minute clouds. This line is a projection on the plane of the rocket trajectories of the vertical line above ground zero as it would have been distorted in 15 minutes by winds. It provides a means for visualizing the amount of shear to be expected in the clouds.

During Shot Navajo, Round 2B, fired 15 minutes and 2 seconds after detonation, and Round 5B, fired 15 minutes and 8 seconds after detonation, were launched at the same quadrant elevation to check the reproducibility of information from rockets following the same trajectories at essentially the same time. Figure 4.7 shows activities measured by rounds as a function of time after launching of individual rockets. Peak intensities recorded agreed within 2 percent. The areas under the curves, which gave a measure of total activity measured by the rockets,

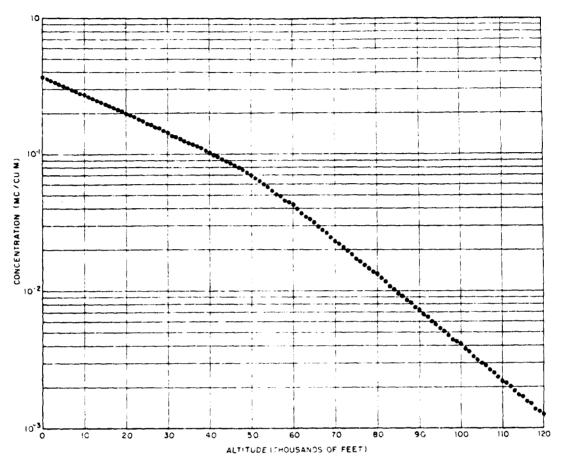


Figure 4.1 Concentration of gamma emitters to produce 1 r/hr field in an infinite volume of air.

agreed within 7 percent, and the times to peak activity were 1 second apart. Since 1 second is the sampling period in the readout system, the peaks could be between 1.5 and 0.5 seconds apart.

Of the four rockets fired during Shot Tewa, only one produced useful radiological information. However, it is of interest to compare the one round producing information with a round fired at the same time after detonation, at the same quadrant elevation of launch and as far as can be determined, at a similar part of Shot Cherokee. Round 3 at Shot Tewa and Round 5A at Shot Cherokee were both fired at 7 minutes after detonation and were launched at a quadrant elevation of 75 degrees. Figure 4.8 shows a comparison of the data obtained from the two rounds. The lower curve shows the Shot Tewa results normalized to the same fission to total yield ratio as Shot Cherokee.

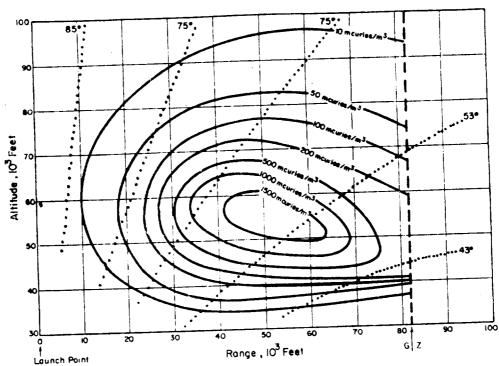


Figure 4.2 Activity distribution in the plane of rocket trajectories 7 minutes after Shot Cherokce.

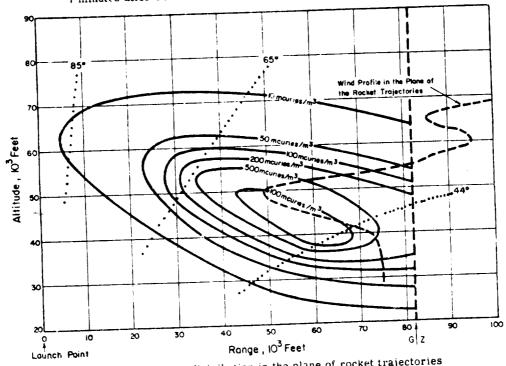


Figure 4.3 Activity distribution in the plane of rocket trajectories 15 minutes after Shot Cherokee.

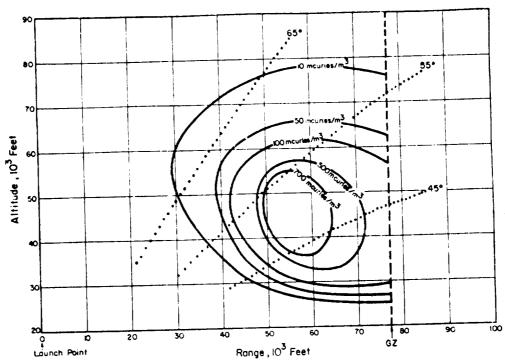


Figure 4.4 Activity distribution in the plane of rocket trajectories 7 minutes after Shot Zuni.

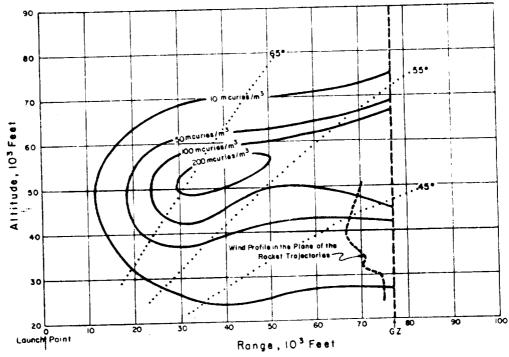


Figure 4.5 Activity distribution in the plane of rocket trajectories 15 minutes after Shot Zuni.

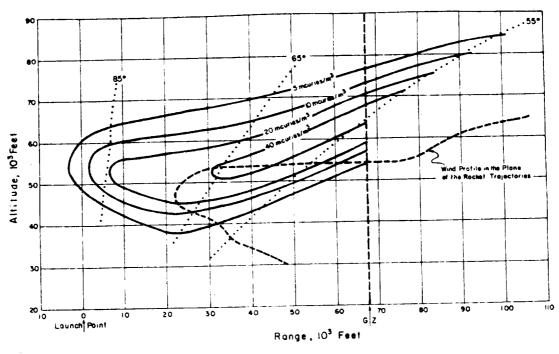


Figure 4.6 Activity distribution in the plane of rocket trajectories 15 minutes after Shot Navajo.

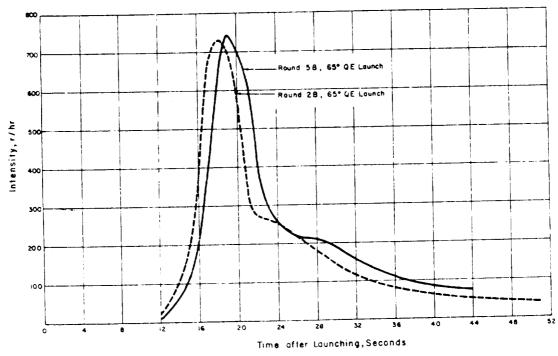


Figure 4.7 Reproducibility of similar rounds fired 15 minutes after Shot Navajo.

The shapes of the curves are similar and the normalized Shot Tewa curve is lower, as might be expected from the higher fallout rates from a water-reef shot as compared to an air burst. This agreement is not of great significance since these rockets went through areas near the edges of the clouds. However, the single set of data

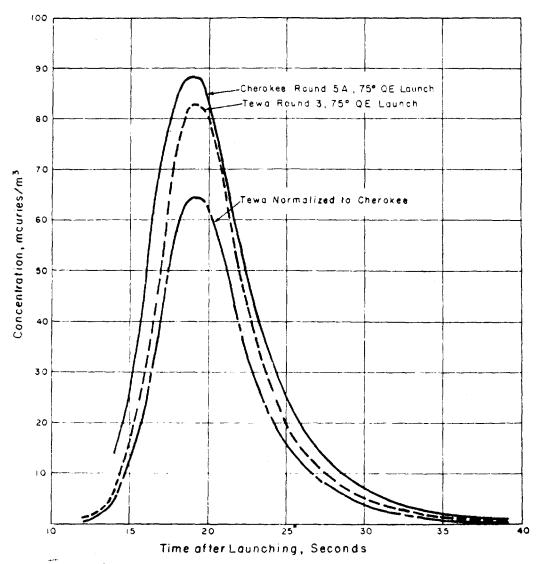


Figure 4.8 Comparison of similar trajectories during Shots Cherokee and Tewa.

obtained from Shot Tewa was not inconsistent with data from Shot Cherokee.

Two of the rockets that were fired through the Shot Navajo stem yielded data. Rocket 1A yielded a peak concentration of 9.3 mc/m^3 while Rocket 2A indicated a peak concentration of 12.6 mc/m^3 . On the basis of the 15-minute measurements made in the cloud, it is estimated that these concentrations would be about 10 percent of the peak concentration in the main body of the cloud at the same time. These rockets passed through the stem at an altitude of about 25,000 feet.

Having constructed the profiles of Figures 4.2 through 4.6, it is possible to obtain an estimate of the total number of photons per second at the time for which the profile is drawn. This esti-

mate of the total activity is made by rotating the profile about its vertical axis through 2 π radians and integrating. Table 4.1 gives these estimates and compares them with the theoretical estimates of cloud activity given in Table 1.1.

Except for the 15-minute Zuni cloud, estimations, based on rocket data, of the total number of photons in the clouds were not influenced by theoretical estimates. Even so, the results agreed closely. The uncertainties involving such items as energy of the photons, axial symmetry of the clouds, and positions of rockets are such that the close agreement might be fortuitous, but it may be concluded that the theoretical values and those derived from rocket data agree, at least, in order of magnitude.

4.3 CONTAMINATION OF THE ROCKET

The possible contamination of the rocket itself was considered important since it would affect the measurements obtained by the radiation transducer. At the velocities attained by the rocket, aerodynamic heating causes the paint to burn off the skin of the rocket, leaving a blackened, charred surface. Subsequent contamination of this surface could cause high background detection in the rocket head. However, examination of the data obtained revealed background counting rates above 6 percent in terms of the peak readings in only four cases and in these cases the peak readings were relatively low. These four sets of data were corrected (see Section 3.2) for contamination of the rocket; however, even if they had not been, the resulting cloud profiles would not have been significantly altered.

Chapter 5 SUMMARY

5.1 CONCLUSIONS

It is concluded that a rocket-borne radiation detection unit with a telemetering transmitter for relaying information to a ground station constitutes a practical system for exploring the spatial distribution of radioactivity in the cloud resulting from a large-yield nuclear detonation. Performance of the system developed for this project may be characterized as generally satisfactory, particularly with respect to the rocket itself and the radiation transducer. Instability of the transmitter-receiver combination resulted in some telemetering failures and consequent loss of data.

Radioactive fields of intensities as high as 3.4×10^4 r/hr were encountered with no apparent attenuation of the telemetering signal.

Information from a salvo of rockets fired through the Shot Navajo stem at 25,000 feet indicate the peak activity at that level to be about 10 percent of the peak activity in the cloud. Since the volume of the cloud is about two orders of magnitude larger than that of the stem, it is estimated that the order of 0.1 percent of the total activity is in the stem.

Contamination of the rocket surfaces was not serious. In terms of peak readings, the maximum contamination encountered was higher than 6 percent on only four rockets. In these cases the peak activity encountered by the rockets was relatively low.

Values derived from rocket data, for the number of photons per second in the clouds agreed with theoretical estimates in order of magnitude.

5.2 RECOMMENDATIONS

It is recommended that further development and refinement be made in order that the system may be available for making early time radiological surveys of nuclear clouds. It is further recommended that the feasibility of using similar systems for measuring energy spectra and decay and for obtaining early-time cloud samples be investigated.

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Appendix SUMMARY of DATA

This Appendix summarizes the data used in preparing the cloud profiles. Trajectory tables and radiation intensity versus time data were supplied by the Cooper Development Corporation. The radiation intensity data were converted to concentration by applying factors from Figure 4.1.

TABLE A.1 SHOT CHEROKEE, ROUND 2A, QE 43 DEGREES

80 10 ⁴ ft 1	Time	Kange	Altitude	Factor	Reading	Concentration	Time	Range	Altitude	Factor	Reading	Concentration
64.8 33.4 12.7 × 10 ⁻¹ 33 4.18 62 109.7 46.7 7.96 × 10 ⁻¹ 3,182 284 58.9 33.4 12.7 × 10 ⁻¹ 116 111 46.5 8.04 × 10 ⁻¹ 3,184 13.7 46.5 8.04 × 10 ⁻¹ 3,184 35.6 35.4 11.2 × 10 ⁻¹ 116 46.5 8.04 × 10 ⁻¹ 4,774 33.84 31.84 37.7 41.7 8.04 × 10 ⁻¹ 4,774 37.8 65.4 31.7 11.6 6.5 8.13 × 10 ⁻¹ 4,746 37.8 65.7 11.6 4,50 8.13 × 10 ⁻¹ 4,746 37.8 11.7 4,50 4,50 37.2 11.6 4,50 11.6 4,50 11.6 4,50 11.6 4,50 11.6 4,50 4,50 4,50 31.8 4,74 4,50 4,50 31.8 4,41 4,50 4,50 4,50 4,50 31.8 4,50 4,50 4,50 4,50 4,50 4,50 31.6 4,50 4,50 4,50 <td< td=""><td>Bec</td><td>10 th</td><td>10° ft</td><td></td><td>r/hr</td><td>mc/m</td><td>ეიფ</td><td>103 ft</td><td>103 ft</td><td>$(mc/m^3)/(r/hr)$</td><td>r/hr</td><td>mc/m³</td></td<>	B ec	10 th	10° ft		r/hr	mc/m	ეიფ	103 ft	103 ft	$(mc/m^3)/(r/hr)$	r/hr	mc/m³
66.9 61.44 12.2 × 10 ⁻³ 66 8.04 63 111.1 46.5 6.04 × 10 ⁻³ 3.864 31.84	20	54.8	33.4		33	4.18	52	109.7	46.7	7.96×10^{-2}	3,752	298.6
89.0 35.4 11.7 × 10.2 11.5 11.5 11.7 × 10.7 4,074 4,074 4,074 4,074 4,074 4,074 4,074 4,074 6.0 6.0 11.5 × 10.2 × 10.2 11.5 × 10.2	21	56.9	34.4		99	8.04	23	111.1	46.5	8.64 × 10 -2	3,884	312.1
61.2 36.4 11.5 × 10 ⁻¹ 181 20.9 55 113.7 46.0 8,19×10 ⁻¹ 4,166 314 65.4 36.4 11.6 × 10 ⁻¹ 429 46.2 56 116.1 45.2 8,27×10 ⁻¹ 4,348 37 65.4 30.2 10.4 × 10 ⁻¹ 429 46.2 56 116.1 45.2 8,47×10 ⁻¹ 4,348 37 60.4 30.2 1,540 115.4 60.2 8,47×10 ⁻¹ 4,622 34 37 73.2 41.4 9.62×10 ⁻¹ 1,570 185.4 61 120.5 8,64×10 ⁻¹ 3,64 31 73.2 41.4 9.62×10 ⁻¹ 4,580 40.8 62 122.1 4,42 8,64×10 ⁻¹ 3,64 31 75.2 41.4 9.6 6 11.2 4.2 8,64×10 ⁻¹ 3,64 31 75.2 42.2 43.8 6 11.2 4.2 8,64×10 ⁻¹ 3,64 75.2 <t< td=""><td>22</td><td>59.0</td><td>35.4</td><td></td><td>115</td><td>13.7</td><td>54</td><td>112.4</td><td>46.2</td><td>8.11×10^{-2}</td><td>4,074</td><td>330.5</td></t<>	22	59.0	35.4		115	13.7	54	112.4	46.2	8.11×10^{-2}	4,074	330.5
6.3.4 37.4 11.2 × 10 ⁻² 29.7 33.2 56 114.0 45.7 6.27 × 10 ⁻² 4,344 376 65.4 38.4 10.8 × 10 ⁻² 42.9 46.2 57 116.1 45.5 8.43 × 10 ⁻² 4,544 37 67.3 39.4 10.4 × 10 ⁻² 72.5 15.0 58 116.6 45.0 8.43 × 10 ⁻² 4,544 37 67.3 39.9 10.1 × 10.4 115.4 59 116.6 45.0 8.43 × 10 ⁻² 4,544 37 73.2 41.2 9.67 × 10 ⁻² 4,560 428.0 62 12.1 43.8 8.43 31 75.2 42.2 9.77 × 10 ⁻² 4,560 45.8 62 12.1 43.8 8.4 10.2 31 75.2 42.2 9.77 × 10 ⁻² 4,560 45.8 65 12.4 4.4 8.6 31 80.5 43.7 43.7 43.8 43.8 44.4 4.4	23	61.2	36.4		181	20.9	55	113.7	46.0	8.19×10^{-2}	4,166	341.2
65.4 38.4 10.8 × 10 ⁻³ 429 46.2 57 116.1 45.5 8.35 × 10 ⁻³ 4.504 370 62.4 39.2 10.4 × 10 ⁻³ 1.75 59 115.4 45.2 8.43 × 10 ⁻³ 4,504 371 71.2 40.7 9.87 × 10 ⁻⁴ 1,870 185.4 60 115.8 44.7 8.60 × 10 ⁻³ 34.34 32.3 77.2 41.4 9.62 × 10 ⁻⁴ 4,562 46.9 61 12.2.1 43.2 8.74 × 10 ⁻³ 3,646 31 77.2 41.4 9.62 × 10 ⁻⁴ 4,562 46.9 61 12.2.1 43.2 8.74 × 10 ⁻⁴ 3,646 31 77.0 42.7 9.07 × 10 ⁻⁴ 4,560 46.9 61 12.1 43.8 8.8 9.03 × 10 ⁻⁴ 3,646 31 12.2.1 43.8 8.9 10 ⁻² 4,438 31.2 41.2 8.74 × 10 ⁻² 3,646 31 12.4 12.4 12.4 12.4 12.4 12.4 12.4 <td>24</td> <td>63.3</td> <td>37.4</td> <td></td> <td>297</td> <td>33.2</td> <td>26</td> <td>114.9</td> <td>45.7</td> <td>8.27×10^{-2}</td> <td>4,348</td> <td>359.6</td>	24	63.3	37.4		297	33.2	26	114.9	45.7	8.27×10^{-2}	4,348	359.6
67.4 39.2 10.4×10^{-2} 725 75.0 59 117.1 45.2 8.43×10^{-2} 4.428 317.1 65.3 39.9 10.1×10^{-2} $1,140$ 115.4 59 118.6 45.0 8.51×10^{-2} 3149 301.2 61.5 118.6 45.0 8.51×10^{-2} 31.84 31.1	52	65.4	38.4		429	46.2	57	116.1	45.5	8.35×10^{-2}	4,504	376.1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	56	67.4	30.2		725	75.0	58	117.4	45.2	8.43×10^{-2}	4,428	373.4
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	27	69.3	39.9		1,140	115.4	69	118.6	45.0	8.51×10^{-2}	4,022	342.4
73.2 41.4 9.62×10^{-2} $3,130$ 301.2 61 120.3 44.2 8.74×10^{-2} $3,646$ 311 75.2 42.2 9.23×10^{-2} $4,952$ 428.0 62 12.1 4.35 8.89×10^{-2} $3,514$ 31.7 75.7 42.2 9.23×10^{-2} $4,952$ 49.8 62 12.1 4.35 9.77×10^{-2} $4,952$ 9.98 9.77×10^{-2} 9.516 9.77×10^{-2} 9.70×10^{-2} <	88	71.3	40.7	9.87×10^{-2}	1,870	185.4	09	115.8	44.7	8.60×10^{-2}	3,834	329.6
75.2 42.2 9.39×10^{-2} $4,560$ 42.0 6.2 $12.2.1$ $4.3.5$ 9.38×10^{-2} $3,514$ 31.7 77.0 42.7 9.23×10^{-2} $4,560$ 456.9 6.3 $12.3.2$ $4.5.5$ 9.03×10^{-2} $3,514$ 30.16 $30.$	29	73.2	41.4	9.62×10^{-2}	3,130	301.2	61	120.9	44.2	8.74×10^{-2}	3,646	318.8
77.0 42.7 9.23×10^{-2} 4.962 456.9 6.3 12.3 $1.2.9$ 9.03×10^{-2} 3.580 32.8 $8.6.7$ $4.3.6$ $4.9.8$ $4.9.8$ $4.9.8$ $4.9.8$ $4.2.4$ $4.2.9$ 9.03×10^{-2} 3.016 2.7 $8.6.5$ $4.9.6$ $4.9.6$ 6.6 $12.5.5$ 41.3 9.43×10^{-2} 2.406 $1.9.6$ $1.9.9$ 9.17×10^{-2} 2.406 $1.9.6$ $1.9.9$ 9.17×10^{-2} 2.406 $1.9.9$	8	75.2	42.2	9.39×10^{-2}	4,560	428.0	62	122.1	43.8	8.89×10^{-2}	3,514	312.3
78.7 43.2 9.07×10^{-2} 4.850 49.8 64 12.4 41.7×10^{-2} 3.016 2.7 80.5 43.7 8.05×10^{-2} 4.854 40.68 65 $12.5.5$ 41.4 9.47×10^{-2} 2.430 22.430 22.430 22.430 22.430 22.430 22.430 22.430 22.430 22.430 $10.25.5$ 41.39 9.65×10^{-2} 2.430 $10.25.5$ $10.25.5$ $10.25.5$ $10.05.5$ 1	31	77.0	42.7	9.23×10^{-2}	4,952	456.9	63	123.2	5.5 5.5 5.5	9.03×10^{-2}	3,580	323.3
80.5 43.7 8.91×10^{-2} $4,564$ 406.8 65 125.5 42.4 9.32×10^{-2} $2,430$ 22 8.2 44.7 8.76×10^{-2} $4,530$ 396.6 16 12.5 41.9 9.43×10^{-2} $2,406$ 19 8.5 44.7 8.60×10^{-2} $4,438$ 391.5 6 12.5 41.9 9.44×10^{-2} 9.66×10^{-2} $1,450$ 16 8.5 45.5 8.51×10^{-2} $4,140$ 352.2 6 129.4 40.2 10.0 $1,450$ 14 8.5 45.5 8.51×10^{-2} $2,964$ 244.4 71 131.4 39.1 10.0×10^{-2} $1,460$ 10.2×10^{-2} $1,460$ 10	32	78.7	43.2	9.07×10^{-2}	4,850	439.8	54	124.4	42.9	9.17×10^{-2}	3,016	276.7
82.2 41.2 8.76×10^{-2} $4,530$ 396.6 $1,6$ 126.5 41.9 9.49×10^{-2} $2,006$ 19 84.0 44.7 8.0×10^{-2} $4,438$ 381.5 67 127.5 41.9 9.6×10^{-2} $1,998$ 19 85.6 4.7 8.0×10^{-2} $4,140$ 352.2 68 128.4 40.8 9.6×10^{-2} $1,450$ 14 87.3 45.5 8.4×10^{-2} 2.964 $2.44.4$ 71 131.4 39.7 10.2×10^{-2} 1.46 11.40 312.2 69 128.4 40.2 10.0×10^{-2} 1.46 1.26	33	80.5	43.7	8.91×10^{-2}	4,564	406.8	65	125.5	42.4	9.32×10^{-2}	2,430	226.5
84.0 44.7 8.60×10^{-2} $4,438$ 381.5 67 127.5 41.3 9.65×10^{-2} $1,698$ 156 85.6 45.0 8.51×10^{-2} $4,438$ 381.5 67 127.5 41.8 9.66×10^{-2} $1,490$ 122.2 68 129.4 40.2 10.0×10^{-2} $1,460$ 12.2 69 129.4 40.2 10.0×10^{-2} $1,246$ 12.2 10.0×10^{-2} $1,246$ 12.2 10.0×10^{-2} $1,244$ 27.8 10.0×10^{-2} $1,244$ 10.0×10^{-2}	34	82.2	ता है है।	8.76×10^{-2}	4,530	396.6	94	126.5	41.9	9.49×10^{-2}	2,006	190.4
85.6 45.0 8.51×10^{-2} $4,140$ 352.2 68 128.4 40.8 9.83×10^{-2} $1,450$ 14.6 12.2 12.4 40.2 10.0×10^{-2} $1,450$ 12.4 12.4 40.2 10.0×10^{-2} $1,460$ 12.4 12.4 40.2 10.0×10^{-2} $1,460$ 12.4 10.0×10^{-2} $1,460$ 10.0×10^{-2} $1,400$ $1,400$ $1,400$ $1,400$ $1,400$ $1,400$ $1,400$	35	84.0	44.7	8.60×10^{-2}	4,438	381.5	6.7	127.5	41.3	9.66×10^{-2}	1,698	164.0
87.3 45.3 8.42×10^{-2} $3,708$ 312.2 69 129.4 40.2 10.0×10^{-2} $1,246$ 12 88.9 45.5 8.33×10^{-2} $3,344$ 278.6 70 130.4 39.7 10.2×10^{-2} $1,246$ 10 90.6 45.8 8.24×10^{-2} $2,964$ 244.4 71 131.4 39.7 10.2×10^{-2} $1,021$ 10 90.6 45.8 8.10×10^{-2} $2,964$ 244.4 71 131.4 39.7 10.4 70 10.2 </td <td>36</td> <td>85.6</td> <td>45.0</td> <td>8.51×10^{-2}</td> <td>4,140</td> <td>352.2</td> <td>89</td> <td>128.4</td> <td>40.8</td> <td>9.83 × 10 -2</td> <td>1,450</td> <td>142.6</td>	36	85.6	45.0	8.51×10^{-2}	4,140	352.2	89	128.4	40.8	9.83 × 10 -2	1,450	142.6
88.9 45.5 8.33×10^{-2} 3.344 278.6 70 130.4 39.7 10.2×10^{-2} 1.021 10 90.6 45.8 8.24×10^{-2} 2.964 244.4 71 131.4 39.1 10.4×10^{-2} 688 7 92.2 46.1 8.16×10^{-2} 2.614 213.2 72 132.4 38.4 10.7×10^{-2} 688 7 92.2 46.3 8.09×10^{-2} 2.949 193.3 75 133.3 37.4 11.1×10^{-2} 688 7 95.2 46.5 8.02×10^{-2} 2.214 177.5 74 134.3 37.4 11.1×10^{-2} 688 7 96.8 46.8 7.05×10^{-2} 2.244 172.4 77 136.2 11.2 2.444 172.4 77 136.2 11.8×10^{-2} 2.62 3.69 3.69 3.69 3.69 3.99 3.99 3.99	37	87.3	45.3	8.42×10 2	3,708	312.2	69	129.4	40.2		1,246	124.8
90.6 45.8 8.24×10^{-2} 2.964 244.4 71 131.4 39.1 10.4×10^{-2} 688 7 92.2 46.1 8.16×10^{-2} 2.614 213.2 72 132.4 38.4 10.7×10^{-2} 688 7 93.7 46.3 8.09×10^{-2} 2.94 193.3 7.5 11.1 710^{-2} 688 7 95.2 46.5 8.09×10^{-2} 2.214 177.5 74 134.3 37.1 11.1 710^{-2} 688 7 96.8 46.8 7.95×10^{-2} 2.214 177.5 74 134.3 37.1 11.2 774 77 136.2 38.5 11.2 774 77 137.2 38.5 11.8 79 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 39.9 $39.$	38	88.9	45.5	8.33×10^{-2}	3,344	278.6	20	130.4	39.7		1,021	105.1
92.2 46.1 8.16×10^{-2} $2,614$ 213.2 72 132.4 38.4 10.7×10^{-2} 688 7 93.7 46.3 8.09×10^{-2} $2,390$ 193.3 75 133.3 37.8 11.1×10^{-2} 586 6 95.2 46.5 8.02×10^{-2} $2,214$ 177.5 74 134.3 37.1 11.1×10^{-2} 586 6 96.8 46.8 7.95×10^{-2} $2,166$ 172.1 75 135.2 36.5 11.1×10^{-2} 381 474 5 56.5 11.5×10^{-2} 381 474 474 47.5 <	39	90.6	45.8	8.24×10^{-2}	2,964	244.4	11	131.4	39.1		842	87.4
93.7 46.3 8.09×10^{-2} $2,390$ 193.3 75 133.3 37.8 11.1×10^{-2} 586 6 95.2 46.5 8.02×10^{-2} $2,214$ 175 74 134.3 37.1 11.2×10^{-2} 474 5 96.8 46.8 7.05×10^{-2} $2,16$ 172.1 75 136.2 36.5 11.1×10^{-2} 381 4 98.3 47.0 7.88×10^{-2} $2,224$ 172.1 77 136.2 35.6 11.8×10^{-2} 381 4 98.3 47.0 7.81×10^{-2} $2,224$ 177.0 77 137.2 35.0 12.0×10^{-2} 381 34.3 12.0×10^{-2} 36.2 31.0	40	92.2	46.1	8.16×10^{-2}	2,614	213.2	72	132.4	38.4		688	74.0
95.2 46.5 8.02×10^{-2} 2.214 17.5 74 134.3 37.1 11.2×10^{-2} 474 5 96.8 46.8 7.05×10^{-2} 2.166 172.1 75 135.2 36.5 11.5×10^{-2} 381 4 98.3 47.0 7.98×10^{-2} 2.124 172.1 77 136.2 35.6 11.8×10^{-2} 381 4 99.8 47.2 7.81×10^{-2} 2.298 177.2 77 137.2 35.6 12.0×10^{-2} 262 31 101.3 47.2 7.81×10^{-2} 2.476 193.3 79 139.1 33.5 12.0×10^{-2} 205 <t< td=""><td>41</td><td>93.7</td><td>46.3</td><td>8.09×10^{-2}</td><td>2,390</td><td>193.3</td><td>73</td><td>133.3</td><td>37.8</td><td></td><td>586</td><td>64.9</td></t<>	41	93.7	46.3	8.09×10^{-2}	2,390	193.3	73	133.3	37.8		586	64.9
96.8 46.8 7.95×10^{-2} 2.166 172.1 75 135.2 36.5 11.5×10^{-2} 381 4 98.3 47.0 7.88×10^{-2} 2.224 175.2 76 136.2 35.8 11.8×10^{-2} 319 39 99.8 47.2 7.81×10^{-2} 2.224 175.2 77 137.2 35.0 12.0×10^{-2} 262 319 101.3 47.2 7.81×10^{-2} 2.278 177.9 78 $138.1 34.3 12.2 \times 10^{-2} 205 2 102.7 47.2 7.81 \times 10^{-2} 2.476 193.3 79 139.1 33.5 12.6 \times 10^{-2} 168 2 104.2 47.2 7.81 \times 10^{-2} 2.748 214.6 80 140.0 32.8 13.0 \times 10^{-2} 168 105.6 47.2 7.81 \times 10^{-2} 3,440 245.2 81 140.8 32.0 13.2 \times 10^{-2} 108 107.1 47.2 7.81 \times 10^{-2} 3,626 285.8 83 142.4 30.3 14.0 \times 10^{-2} 59$	5	95.2	46.5	8.02×10^{-2}	2,214	177.5	74	134.3	37.1		474	53.4
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	43	8.96	46.8	7.95×10^{-2}	2,166	172.1	75	135.3	36.5		381	43.9
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	44	98.3	47.0		2,234	175.2	92	136.2	35.8		319	37.6
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$. 4	α σ	6 17		2,208	172.4	17	137.2	35.0		262	31.9
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	94	101.3	47.2		2,278	177.9	78	138.1	34.3		202	25.1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4.7	102.7	47.2		2,476	193.3	43	139.1	33.5		168	21.1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	84	104.2	47.2		2,748	214.6	80	140.0	32.8		157	20.4
107.1 47.2 7.81×10^{-2} $3,360$ 262.3 82 141.6 31.2 13.4×10^{-4} 78 1 107.1 47.0 7.68×10^{-2} $3,626$ 285.8 83 142.4 30.3 14.0×10^{-2} 59	67	105.6	47.2		3,140	245.2	81	140.8	32.0		108	24.3
108.4 47.0 7.68×10 ⁻² 3,626 285.8 83 142.4 30.3 14.6 ×10 ⁻² 59	205	107.1	5.7	_æ	3,360	262.3	82	141.6	31.2		18	10.7
	51	108.4	47.0	7.88×10^{-2}	3,626	285.8	83	142.4	30.3	- 1	29	8.29

TABLE A.2 SHOT CHEROKEE, ROUND 3A, QE 53 DEGREES

Time	Range	Altitude	Factor	Reading	Concentration	Time	Range	Altitude	Factor	Reading	Concentration
26.0	103 ft	103 ft	(mc/m³)/(r/hr)	r/hr	mc/m³	sec	10° ft	10° ft	(mc/m³)/(r/hr)	r/hr	mc/m
} :		6	2-01 > 111	573	63.4	28	121.3	83.7	1.03×10^{-2}	1,365	14.0
4:	4.54	0.70		268	6.06	59	123.0	84.0	1.01×10^{-2}	1,401	14.2
3 9	41.1	0.00 a 14	_	1.968	187.2	9	124.8	84.3	0.990×10^{-2}	1,433	14.2
9 2	7.4	. 4 . 4 . 6		4.294	381.4	19	126.6	84.5	0.976×10^{-2}	1,451	14.2
6	4 6	. 4 . 4		8.736	720.9	62	128.4	84.7	0.961×10^{-2}	1,469	14.1
3 5	9.05	47.4		13,300	1,028.6	63	130.2	85.0	0.947×10^{-2}	1,487	14.1
; ;	3 5	49.1		18.860	1,360.8	64	132.0	85.2	0.939×10^{-2}	1,505	14.1
77	55.9	50.7		24,380	1,633.4	65	133.8	85.4	0.932×10^{-2}	1,523	14.2
3 6	7.00	52.4		28,280	1,749.1	99	135.6	85.4	0.930×10^{-2}	1,541	14.4
25	59.5	54.0		29,320	1,662.4	67	137.4	85.5	0.929×10^{-2}	1,559	14.5
1 8			5.90 × 10-2	26.000	1,353.9	89	139.3	85.5	0.928×10^{-2}	1,577	14.5
9 6	6.10	6.00		19.040	931.6	69	141.1	85.6	0.927×10^{-2}	1,595	14.8
7 8	9.00	. a		12,960	582.0	70	142.9	85.6	0.925×10^{-2}	1,610	14.9
3 8	9.69	- o		966.6	427.5	11	144.6	85.4	0.930×10^{-2}	1,610	15.0
6 6	69.7	61.3		8,024	308.4	12	146.3	85.3	0.936×10^{-2}	1,610	12.1
3 7		2 2 2		6.366	224.9	73	148.1	85.1	0.941×10^{-2}	1,610	15.2
3 8		8 2 9		5.440	181.8	74	149.8	85.0	0.948×10^{-2}	1,610	15.2
3 6	9 4	65.0		4.694	147.7	75	151.5	84.8	6.948×10^{-2}	1,610	15.4
3 3	13.0	99.0		4.038	117.5	16	153.0	84.4	0.981×10^{-1}	1,610	15.8
5 2	20%	67.5	· ×	3,682	0.66	7.7	154.6	84.1	1.00×10^{-2}	1,610	16.2
3	5	<u>}</u>			3	ě	156.1	63	1.03 × 10 ⁻²	1.610	15.5
98	81.4	9.89	×	3,336	7.40	9 6	150.1	83.4		1.610	16.9
37	83.3	69.7	×	2,898	7.90	<u>.</u>	150.0			1,610	17.2
æ	85.1	7.0.7	×	2,294	1.16	2 3	139.6	900		1 610	17.9
33	87.0	71.8	×	2,112	4.	5 6	169.5	9.70		1.610	18.6
9	88.9	72.9	×	1,960	e 6	20	164.0	1.70		1,610	1.61
7	90.1	73.7	×	1,890	35.3		104.2	01.0		0191	19.61
42	92.5	74.5	×	1,596	28.2	z :	165.6	2.10		1 610	20.1
43	94.4	75.2	×	1,554	26.2	G 6	0.701	60.0		1.610	20.9
Į	9 6 .2	16.0	×	1.610	26.4	9 5	1.691	1.00		1.610	21.6
45	98.0	76.8	1.56 × 10 ⁻²	1,610	25.1			ė			
46	8 66	77.5	1.49×10^{-2}	1,538	23.0	88	172.3	19.1		1,610	22.2
2 5	101	78.2		1,286	18.5	68	173.9	18.6		019'1	22.8
. 4	103.5	79.0		1,430	19.9	96	175.5	78.0		1,602	23.2
2 9	105.3	79.7		1,358	18.2	16	177.0	17.4		1,566	23.6
; ;	102.1	80.4		1,077	13.8	35	178.4	76.8		1,530	23.9
3 5	6 801	6.08		1,113	13.8	93	179.9	76.2		1,494	24.2
; ;	110.7	4.18		1,149	13.9	94	181.3	75.6		1,458	24.3
3 5	112.4	81.8	×	1,185	14.0	95	182.8	15.0		1,422	24.2
3 3	114.2	82.3	×	1,221	13.9	96	184.6	73.9		1,386	25.5
5 £	116.0	82.8	×	1,257	13.7	97	186.3	72.8		1,350	7.97
3 %	117.8	83.1		1,293	13.8	86	188.1	711.7		1,314	27.8
3 5	110.0	4 5 6		1,329	13.9	66	189.8	20.6	2.24 × 10 ⁻²	1.278	28.6
;											

TABLE A.3 SHOT CHEROKEE, ROUND 4A, QE 65 DEGREES

TABLE A.4 SHOT CHEROKEE, ROUND 5A, QE 75 DEGREES

Time	Kange	Aititude	r actor	e man		1	0	שונוות	101784		
sec	10³ ft	10³ ft	(mc/m³)/(r/hr)	· r/hr	mc/m³	sec	10° ft	10° ft	(mc/m³)/(r/hr)	r/hr	mc/m³
15	27.3	44.7	_	879	75.6	71	15.9	46.4	80.8×10^{-3}	168	13.6
16	29.5	47.5	×	2,315	178.7	15	17.2	50.1	69.1×10^{-3}	428	29.6
11	31.1	50.3	_	5,672	388.0	16	18.4	53.3	52.8 × 10 ⁻¹	807	47.4
18	32.9	53.1	×	12,166	725.0	17	19.6	56.6	49.4×10^{-3}	1,380	68.3
19	34.8	55.8	×	22,640	1,151.2	18	20.9	59.8	42.7×10^{-3}	1,971	84.2
20	36.6	58.6	×	29,460	1,312.8	19	22.1	63.1	34.4 × 10 -1	2,570	88.4
21	38.4	61.1	×	33,160	1,291.9	20	23.3	66.4	28.8 × 10 ⁻³	2,864	82.6
22	40.2	63.6		30,280	1,019.0	21	24.5	69.4	24.0×10^{-3}	2,872	6.89
23	42.0	66.1	29.3×10^{-3}	22,840	670.7	23	25.6	72.4	20.3 × 10 ⁻³	2,717	55.1
54	43.7	9.89		16,000	402.8	!					
52	45.5	71.1		11,900	260.2	53	26.8	75.4		2,511	42.1
26	47.2	73.4		9,280	176.8	24	28.0	78.4		2,238	30.0
i			•			22	29.5	81.4		2,066	25.0
27	49.0	75.6	16.6 × 10 ⁻³	7,456	123.9	56	30.3	84.1	10.0 × 10 ⁻³	1,807	18.1
58	50.7	77.9	14.5×10^{-3}	6,160	89.8	27	31.5	86.9	8.55×10^{-3}	1,672	14.3
53	52.4	80.1	13.0×10^{-3}	5,112	66.7	28	32.6	89.7	7.33×10^{-3}	1,480	10.8
30	54.1	82.4	11.2×10^{-3}	4,366	49.2	59	33.8	92.5	6.22×10^{-3}	1,352	8.42
31	55.8	84.5	9.77×10^{-3}	3,830	37.4	30	34.9	95.3	5.27 × 10-5	1,223	6.44
32	57.5	86.6	8.76×10^{-3}	3,322	29.1	31	36.1	97.9	4.45×10^{-3}	1,102	4.90
33	59.2	88.6	7.78×10^{-3}	2,868	22.3	cc	0 60	100 5	4 95 × 10 -3	666	3 65
34	6.09	90.7	6.90×10^{-3}	2,724	18.8	7 6	7.1.0	100.	1.30 × 10 - 1	ŝ	9 6
32	62.6	92.8	6.08×10^{-3}	2,302	14.0	3 3	.00	106.7	0.30 × 10 - 0	4	6.3
36	64.3	94.7	5.45×10^{-3}	2,064	11.2	5 8	7.65	1001	2.02 × 10 -8	349	
37	0.99	9.96	4.86×10^{-3}	1,894	9.20	6	9.0	100.5	01 00.7	2 5	
38	67.7	98.5	4.34×10^{-3}	1,724	7.48	8 :	#I:#	110.7	2.10 × 10 -8	3	1.5
ć	ć	1 001	- 01 > 00 6	1 643	, S	5 8		116.1	- 91 × 79 -	3	6 957
6. 4	23.5	100.4	3.54 × 10 -3	1.462	87.5	3 2	45.2	118.0	1.40 × 10 -6	2	6.739
. 4	72.7	104.0	3.16 × 10 -3	1.420	4.48				1		
42	74.4	105.7	2.89×10^{-3}	1,340	3.87						
43	76.0	107.4	2.61 × 10 ⁻¹	1,208	3.16						
4	77.7	109.1	2.34×10^{-3}	1,044	2.4						
45	79.4	110.8	2.15×10^{-1}	186	2.12						
46	81.0	112.4	1.97×10^{-3}	959	1.89						
47	82.7	113.9	1.77×10^{-3}	932	1.65						
48	84.4	115.5	1.64 × 10 -3	904	1.48						
49	86.0	117.0	1.50×10^{-3}	876	1.32						
90		2 314	7-01 > 30 1	070							

TABLE A.6 SHOT CHEROKEE, ROUND 2B, QE 44 DEGREES

	Time	Range	Altitude	Factor	Reading	Concentration
	a	101 110	10° ft	(mc/m³)/(r/hr)	r/hr	mc/m
	;		9	14.3 × 10 -2	292	38.8
	10		33.9	×	571	73.0
	61	0.10	3.4.5	×	1.196	145.0
	3 2	5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5	2 y 2		3.024	356.7
	17	9 6		×	6 120	697.4
	22	9.90	0 00	()	896 6	1.101.2
	23	8.09	37.8	01 4	996.6	1 169 1
tration	24	67.9	38.9	≘ ×	11,180	1.001,1
	25	65.1	40.0	x 10	12,040	1,216.0
, E	26	67.1	40.8	9.82 × 10 -2	10,136	995.5
	27	0.69	41.6	9.56×10^{-2}	7,292	697.2
1 2	ć		9	9 30 × 10 -2	5 902	549.0
0 1	97	0.17	2.5	•	2 060	457.6
7.1	29	72.9	45.0	()	2000	193 4
26	30	74.9	44.1	ĸ	911.1	
80	31	76.7	44.6	×	3,984	3.040
3 6	32	78.5	45.2	×	3,566	301.1
96	33	80.2	45.7	8.28×10^{-2}	3,224	266.8
	35	82.0	46.3	8.11×10^{-2}	2,914	236.2
55	58	83.8	46.8	7.93×10^{-2}	2,700	214.2
98	9 6	2 5 8	47.2	7.82×10^{-2}	2,448	191.4
14	8 :		47.5	×	2,230	171.9
20	Š	7:10	•			•
96	38	88.9	47.9	7.60×10^{-2}	2,074	157.6
**	39	90.6	48.2	7.48×10^{-2}	1,968	147.3
5 96	\$	92.3	48.6	7.37×10^{-2}	1,850	136.3
2	2 5	636	6.84	7.28×10^{-2}	1,694	123.3
.65	‡ \$. 4	2.64	7.19 × 10 -2	1,582	113.8
36	7.		7 67	×	1.454	103.3
60		0.16	40.7	×	1,348	94.6
068		9		×	1.272	88.1
720	.	1007	9	×	1,192	82.4
575	9	9.101	2.03	. >	1 1:18	17.2
465	4.1	103.1	1.00	•		
	48	104.7	50.1	6.89×10^{-2}	1,042	71.8
	2 4	106.2	50.2	6.88×10^{-2}	1,010	69.5
		107 7	20.5	6.87×10^{-2}	962	0.99
	3 5	1.00	50.1	6.91×10^{-2}	882	0.19
	5	110.5	49.9	6.95×10^{-2}	820	59.1
	3 5	1118	49.8	7.00×10^{-2}	804	56.3
	5	113.3	9.69	7.04 × 10 -2	774	54.5
	. 4	114.6	49.5	7.08×10^{-2}	174	54.8
	9	115.9	49.2	7.16×10^{-2}	174	22.5
	3	*****	1			

TABLE	A.5 8HC	T CHEROK	TABLE A.5 SHOT CHEROKEE, ROUND 6A, QE 85 DEGREES	E 85 DEGR	EES
Time	Range	Altitude	Factor	Reading	Concent
)	10° ft	101 A	(mc/m³)/(r/hr)	r/hr	/ow
5	ď	52.9	60.2×10^{-3}	33	1.9
2 %		56.4	49.8 × 10 -1	12	3.5
2 5	4	29.9	42.6 × 10 ⁻³	112	4.7
; =	2,2	63.4	33.9 × 10 -3	164	5.5
6		67.0	27.7×10^{-3}	219	9.0
20	8.0	70.5	22.5 × 10 -1	264	5.9
12	8.4	73.8	18.6 × 10 ⁻¹	321	5.9
22	e0 e0	11.0	15.4 × 10 ⁻³	361	5.5
23	9.5	80.3	12.9 × 10 ⁻³	385	1.9
24	9.6	83.5	10.4 × 10 ⁻⁸	399	4.1
52	10.0	86.8	8.62×10^{-3}	406	3.5
56	10.4	89.9	7.28×10^{-1}	410	2.9
27	10.8	92.9	6.02 × 10 -1	406	7.5
28 28	11.2	96.0	5.05×10^{-3}	397	2.0
28	11.7	99.0	4.24 × 10 ⁻³	389	1.6
8	12.1	102.1	3.59×10^{-3}	378	
	12.5	105.0	2.99×10^{-3}	365	9.7
32	12.9	107.9	2.54×10^{-3}	350	3
88	13.3	110.7	2.16 × 10 ⁻³	334	Ö
8	13.7	113.6	1.81 × 10 -1	318	
35	14.1	116.5	1.55 × 10 ⁻¹	301	ò

TABLE A.7 SHOT CHEROKEE, ROUND 4B, QE 65 DEGREES

Concentration

4.99 8.71 12.3 10.2 7.11 5.12 3.62 2.52 1.76

Time	Range	Altitude	racioi	Meading							
sec	10³ ft	10 ⁵ ft	(mc/m³)/(r/hr)	r/hr	mc/m³						
14	25.3	41.4	96.2×10^{-3}	100	9.71	TABLE		T CHEROK	SHOT CHEROKEE BOUND 6B.	OE 85 DEGREES	EES
15	27.3	44.7	86.9 × 10 ⁻³	336	28.91	37701					
16	29.5	47.5	77.2 × 10 -3	993	16.70						,
17	31.1	50.4	68.4 × 10 -3	2,878	196.9	Time	Range	Altitude	Factor	Reading	Conc
18	32.9	53.1	59.6×10^{-3}	8,164	486.5						
19	34.8	55.8	50.8×10^{-3}	7,316	372.0	sec	10 , ft	103 ft	(mc/m ²)/(r/hr)	r/hr	E
70	36.7	58.6	44.6 × 10 ⁻¹	2,732	121.7	4	ď	62.9	60.2 × 10 -1	83	
21	38.4	61.1	39.0×10^{-3}	1,692	62.9	3 4		56.4	×	175	
22	40.2	63.6	33.7×10^{-3}	1,056	35.6	1.7	9 6	59.9		288	
ć	67	66.1	29.4 × 10 -3	818	24.0	. 82	7.2	63.4	×	360	
3 2	73.7	. 99 9 6		564	14.2	13	7.6	67.0	27.7×10^{-3}	366	
F 7	45.5	2.5		483	10.6	50	8.0	70.5	22.5 × 10 ⁻³	316	
76	47.9	73.4		360	98.9	21	8.4	73.8	18.6 × 10 ⁻³	275	
0 6	7.1.1	75.6		322	5.35	22	8.8	77.0	15.4 × 10 ⁻³	235	
2 6	50.7			280	4.08	23	9.5	80.3	12.9 × 10 ⁻³	195	
53	52.4	80.2		280	3.65	24	9.6	83.5	10.4×10^{-3}	170	
30	54.1	82.4	11.3 × 10 -3	242	2.72	20	10.0	86.8	8.62×10^{-3}	139	
31	55.8	84.5	9.77×10^{-3}	242	2.36	, 56	10.4	89.9	7.28 × 10 -3	125	
5	5.75	98	8.76 × 10 -3	242	2.12	27	10.8	92.9	6.02×10^{-3}	112	
3 5	6.65	88.6	7.78 × 10 -3	204	1.59	58	11.2	0.96	5.04×10^{-3}	6 6	
3 2	6.09	90.7	6.90×10^{-3}	204	1.41	53	11.7	99.0	4.24×10^{-3}	98	
5	62.6	92.8	6.08 × 10 -1	168	1.03	30	12.1	102.1	3.59 × 10 -	73	
3 %	64.3	94.7	5.45×10^{-3}	165	0.899	31	12.5	105.0	2.99×10^{-3}	19	
3.2	0.99	96.6	4.86×10^{-1}	123	0.600	32	12.9	107.8	2.54×10^{-3}	3	
; 2	67.7	98.5	4.34 × 10 -1	119	0.515	33	13.3	110.7	2.16 × 10 ⁻³	28	
3 5	69.3	100.4	×	119	0.474	8	13.7	113.6	×	46	
9	71.0	102.2	3.54×10^{-3}	119	0.421	35	14.1	116.5	1.55 × 10 ⁻¹	7	
17	79.7	104.0	3.16 × 10 -3	119	0.375						
42	74.4	105.7	2.89×10^{-3}	84	0.244						
. . .	76.0	107.4	2.61 × 10 -1	81	0.211						
4	77.7	109.1	2.34×10^{-3}	81	0.189						
45	79.4	110.8	2.15×10^{-1}	81	0.174						
46	81.0	112.4	1.97×10^{-3}	81	0.159						
£.	82.7	113.9	1.77 × 10 -8	81	0.143						
48	84.4	115.5	1.64×10^{-3}	18	0.132						
	•		- 01 > 00 .	10	1010						

1.20 0.910 0.673 0.499 0.364 0.182 0.182 0.152 0.068

TABLE A.9 SHOT ZUNI, ROUND 3A, QE 45 DEGREES

Time	Range	Altitude	Factor	Reading	Concentration	Time	Range	Altitude	Factor	Reading	Concentration
		4 600	1. 3. //- A-/	1	mc/m	208	103 ft	109 ft	(mc/m³)/(r/hr)	r/hr	mc/m³
3ec	10.U	10. 11		r/ m	1110/111	3	:	,			
•	7 87	3.15	13.3 × 10 ⁻²	115	15.3	22	115.3	53.1	5.94×10^{-6}	3,727	2.21.7
= :	r 0			569	73.4	26	116.7	52.9	6.01×10^{-2}	3,811	229.2
9 :	40.5	3 3	1-01 × 101	2534	308.2	57	118.1	52.7	6.08×10^{-2}	3,923	238.6
8 1	4.10 1.4	# C	11 7 10-2	200.7	6.655	80	119.4	52.5	6.15×10^{-2}	4,094	251.8
20	53.8	તું કુ જ	11.0 × 10-1	449	9 7 9 7 8	65	120.8	52.2	6.21×10^{-2}	4,204	261.5
21	26.0	37.0	11.2 × 10	26.5	210.8	3 2	122.2	52.0	6.28×10^{-2}	4,358	274.0
22	28.5	2.98	10.8 × 10	0,000	730.5	3 2	123.5	51.7	6.39×10^{-2}	4,434	283.7
23	3	39.3	10.3 × 10 -	1,163	29.9	; ç	124.8	51.3	6.50×10^{-2}	4,658	303.2
5 4	62.5	40.4	2-01 × 40.5	#70°0	605.0		126.2	51.0	6.62×10^{-2}	4,916	325.4
52	54.7	41.6	9.58 × 10	076.0	9	3			2 - 10 - 2	5 180	348.9
26	66.7	42.4	9.30×10^{-2}	6,468	601.9	5	127.5	20.6	0.13 × 10	201	35.4 9
	68.6	43.3	9.02×10^{-2}	6,304	469.2	65	128.8	50.2	6.84 × 10 =	081,6	365.6
	300	44.2	8.75 × 10 ⁻²	660.9	534.1	99	130.0	49.7	7.00 × 10 ±	022,6	203.0
9 9	9.00	45.1	R. 47 × 10 -2	5.472	463.9	67	131.3	49.3	7.15×10^{-1}	5,430	388.7
R 2	9.7.	4 4	8 20 × 10 ⁻²	4.787	392.9	89	132.5	48.8	7.31×10^{-2}	5,712	417.7
3 3		, d	2-07 × 00 °	4 336	346.8	69	133.7	48.3	7.47×10^{-2}	6,071	453.6
ន	76.4	9.0	1.33 × 10 -2	4 200	327.2	20	135.0	47.8	7.62×10^{-2}	6,229	475.1
32	78.2	47.2	7.79 × 10	207.	316.9		136.1	47.2	7.81×10^{-2}	6,400	200
33	80.0	47.9	7.58 × 10	4,110	204.0		137.3	46.5	8.01×10^{-2}	6,459	517.7
ಸ	81.9	48.6	7.38 × 10	4,130	0.1.0	<u> </u>			7 4 7		6 96 9
9	6 6 6	40%	7 17 X 10 -2	4.266	306.0	73	138.5	45.9	8.21×10^{-1}	7,041	2.69.0
3	200	100	7 03 × 10 -2	4.292	301.8	74	139.6	45.3	8.40×10^{-2}	7,532	633.0
8	65.4		2 00 0 00 0	1000	279.7	75	140.8	44.7	8.59 × 10 ⁻⁴	7,830	673.3
37	87.1	20.1	8.00 × 10 2.01 × 10 -2	200,4	957.9	16	141.9	44.0	8.83×10^{-2}	7,915	699.1
88	88.8	20.6		0,000	6 96 0	4.4	143.0	43.2	9.05×10^{-1}	7,858	711.8
39	90.5	61.0	6.59 × 10	3,560	2.96.2		144.0	42.5	9.29×10^{-2}	7,728	717.9
ş	92.2	51.5	6.45 × 10	3,335	213.3	0 6	1451	¥ 17	9.52 × 10 ⁻²	7,500	714.1
7	93.8	51.8	6.37 × 10 -	3,186	0.502	2	1.91	7	9 74 × 10 -2	7,200	701.8
7	92.2	52.0	6.28×10^{-1}	3,141	197.4	08	140.2	0.44	2-01 > 001	6.460	647.8
**	97.1	52.3	6.19 × 10 ⁻²	3,225	199.8	81	147.2	40.2			
:		: :	7	2000	203 7	83	148.2	39.4	10.2×10^{-2}	2,000	514.2
Į	98.7	97.0	0.10	20,0	900	ď	149.2	38.6	10.6×10^{-2}	2,750	293.2
45	100.3	52.9	6.02 × 10 =	5,433	0.000	76	150.2	37.7	11.0 × 10 ⁻²	1,640	181.7
4	101.9	53.0	5.98 × 10	3,680	220.3	,	161.9	36.9		1,030	116.8
4.1	103.4	53.1	6.95 × 10 ⁻²	3,940	234.6	60	1.101	0.00	×	657	76.8
84	104.9	53.2	5.92×10^{-2}	3,714	220.0	90	1.761	26.0		452	54.1
6	106.5	53.3	5.89×10^{-2}	3,449	203.2	200	153.0	1.00	×	265	32.5
5	108.0	53.4	5.85×10^{-2}	3,302	193.4	88	153.9	24.2	()	179	21.9
3 2	109.5	53.3	5.87×10^{-2}	3,357	197.3	83	154.8	33.3	()	96	12.7
3 4	9 011	53.3	5.89 × 10 ⁻²	3,429	202.1	6	155.7	32.4	Χ '	9, 9	6.57
70	6.011		5 91 × 10 -2	3.513	207.7	91	156.5	31.4		<u>,</u>	
53	112.4	33.2	2-01 > 10-1	3 679	917.8	92	157.3	30.5	13.8×10^{-2}	41	- 0.0
2	113.8	53.2	< −	3,0,0	•	6	158.1	29.6	14.4×10^{-2}	41	5.93
							-				

TABLE A.10 SHOT ZUNI, ROUND 4A, QE 55 DEGREES

		A learned	Factor	Reading	Concentration	Time	Range	Altitude	Factor	Reading	Concentration
ıme	Kange	anniii.					2 10.	4 60.	(mc/mg)/(r/hr)	r/hr	mc/m³
	3036	103 6	(mc/m)/(r/hr)	r/hr	mc/m	sec	10_11	1 01	(mc/ m // m/)	•	
၁ခန	10 11	:		•	•	9	86.9	78.0	14.5 × 10 ⁻³	404	5.87
36	37.8	39.5	'n	149	19.4	·		0.00	13 9 × 10 -8	387	5.39
2 5	40.1	41.6	95.6×10^{-3}	450	43.1	41	88.6	0.61	2-01 > 01	348	4.60
7	• • •	9 6 7	æ	1.120	99.9	4 2	90.6	80.0	10.2 0 10	976	66 7
18	47.4	13.0		0000	180.6	43	92.5	81.0		0	
19	44.7	46.0	82.0 × 10	007.7	2.02.	44	94.3	82.0	11.7 × 10 ⁻³	328	3.85
20	47.0	48.1	75.2 × 10 -	4,615	347.5	,	06.9	93.0	10.7×10^{-3}	267	2.87
1 2	49.2	49.9	69.5 × 10 ⁻³	8,300	576.7	Ç# *	1 0) or	10.2 × 10 ⁻¹	232	2.37
		51.8	63.7×10^{-3}	11,600	738.9	0.4	98.0	,	0 69 × 10 -3	232	2.25
1 6	4 8 6	53.6	57.9 × 10 ⁻³	12,740	137.8	4.7	9. 9.	84. b	24 (69.6		4
3	5	!				9.7	101.7	85.4	9.30×10^{-3}	232	2.16
24	55.5	55.4	52.1 × 10.	11,063	2.07.0	•	103 6	8	8.96×10^{-3}	232	2.08
	57.6	57.3	47.8×10^{-3}	8,030	384.3	9.	103.6		8 47 × 10 -3	232	1.96
3 6	9 65	6.85	44.3×10^{-3}	5,115	226.5	20	105.4	1.10	- 01 × 30 0	232	1.92
07		2:03	41.1×10^{-3}	3,380	139.0	51	107.2	87.8	0.20 0.00	666	1.76
7.7	0.10	F.00	7 0 0 0 0	9 545	93.0	25	109.0	88.4	7.92 × 10	1 4 4	
88	63.6	62.0	36.2 × 10	250.	6 29	53	110.9	89.1	7.54×10^{-1}	172	1.30
59	65.7	63.6	$33.7 \times 10^{\circ}$	1,900	1 100	* 4	119 9	89.7	7.32×10^{-1}	172	1.26
30	67.7	65.2	31.1×10^{-3}	1,560	48.5	,	114.5	4 06	7.06 × 10 ⁻³	172	1.21
3 2	9.69	9.99	28.5×10^{-3}	1,258	35.9	e e	0.417			•	1020
;			1		3 40	95	116.3	90.9	6.82×10^{-3}	110	10.0
32	71.6	67.9	26.2×10	to.	0.1.7	2	1 811	91.4	6.65 × 10 ⁻³	109	07.70
	73.5	69.3	24.1 × 10 ⁻³	914	22.0	5 6	0 011	6.16	6.50×10^{-3}	102	0.664
	75.4	70.7		186	17.5	90	6.61	7 60	6-29 × 10 -3	95	0.599
5 6	7 00	7.9.1	20.7×10^{-3}	902	14.6	29	121.7	170	6 of v 10 -3	60	0.535
G ;	• · · · ·			614	11.8	9	123.5	92.8	0.00	-	0.483
8	6.6	7:57		556	8.6	61	125.3	93.2	5.92 × 10		0.435
37	81.2	4.4.		909	8 39	62	127.1	93.5	5.82 × 10		8000
38	83.1	75.6		006	9 6	63	128.9	93.8	5.72×10^{-3}	67	0.360
39	85.0	76.8	15.6 × 10 -*	446	0.90	3 4	130.6	94.2	5.62×10^{-1}	61	0.342

TABLE A.11 SHOT ZUNI, ROUND 5A, QE 65 DEGREES

Time	Range	Altitude	Factor	Reading	Concentration
sec	10 ³ ft	10 ³ ft	(mc/m ³)/(r/hr)	r/hr	mc/m³
16	29.2	47.5	77.2×10^{-3}	31	2.39
17	31.1	50. 3	68.4×10^{-3}	185	12.6
18	32.9	53.1	59.6×10^{-3}	370	22.0
19	34.8	55.8	50.8×10^{-3}	586	29.8
20	36.6	58.6	44.6×10^{-3}	771	34.3
21	38.4	61.1	39.0×10^{-3}	804	31.3
22	40.2	63.6	33.6×10^{-3}	741	24.9
23	42.0	66.1	29.4×10^{-3}	710	20.8
24	43.7	68.6	25.2 × 10 ⁻³	678	17.1
25	45.5	71.1	21.9×10^{-3}	647	14.1
26	47.2	73.4	19.0×10^{-3}	615	11.7
27	49.0	75.6	16.6×10^{-3}	588	9.77
28	50.7	77.9	14.6×10^{-3}	557	8.12
29	52.4	80.2	13.0×10^{-3}	540	7.04
30	54.1	82.4	11.3×10^{-3}	525	5.91
31	55.8	84.5	9.77×10^{-3}	494	4.83
32	57.5	86.6	8.76×10^{-3}	463	4.06
33	59.2	88. 6	7.78×10^{-3}	448	3.48
34	60.9	90.7	6.90×10^{-3}	431	2.97
35	62.6	92.8	6.08×10^{-3}	415	2.52
36	64.3	94.7	5.45×10^{-3}	414	2.26
37	66.0	96.6	4.86×10^{-3}	382	1.85
38	67.7	98.5	4.33×10^{-3}	368	1.59
39	69.3	100.3	3.99×10^{-3}	360	1.43
40	71.0	102.2	3.54×10^{-3}	350	1.24
41	72.7	104.0	3.16×10^{-3}	338	1.07
42	74.4	105.7	2.89×10^{-3}	310	0.895
43	76.0	107.4	2.62×10^{-3}	291	0.761
44	77.7	109.1	2.34×10^{-3}	278	0.650
45	79.4	110.8	2.15×10^{-3}	2 6 0	0.558
46	81.0	112.4	1.97×10^{-3}	247	0.486
47	82.7	113.9	1.77×10^{-3}	228	0.403
48	84.4	115.5	1.64×10^{-3}	216	0.354
49	86.0	117.0	1.50×10^{-3}	209	0.314
50	87.7	118.6	1.35×10^{-3}	20 3	0.273

TABLE A.12 SHOT ZUNI, ROUND 2B, QE 45 DEGREES

au.	Range	Altitude	Factor	Reading	Concentration	Time	range		,		
	3 60.	103 61	(mc/m³)/(r/hr)	r/hr	mc/m³	308	10° fi	10, ft	(mc/m³)/(r/hr)	r/hr	mc/m³
208	10.	10 11	2		•	70	106.5	53.3	5.89×10^{-2}	4,172	245.8
13	35.6	24.8		£ ;	D .	2 5	108.0	53.4	5.86×10^{-2}	3,798	222.5
14	38.5	26.7		114	7.90	3 7	3 601	53.3	5.88×10^{-2}	3,660	215.1
15	41.5	28.6		133	0.02	3 6	110.0	53.3	5.89×10^{-2}	3,265	192.4
16	44.9	30.1		153	0.12	3 5	119.4	6 86	5.91×10^{-2}	2,922	172.8
17	46.4	31.5		173	23.1	3 3	11.2 8	5.8.2	5.93 × 10 ⁻²	2,652	157.3
18	48.9	33.0	×	179	23.1	7 5	116.9	7.5.5	5.95 × 10 ⁻²	2,487	147.9
19	51.4	34.4		155	180.00	ຂໍ້	110.5	1.00	6.02 × 10 -1	2,461	148.0
20	53.8	35.9		128	15.0	3 5	110.7	6.76	6.08 × 10 ⁻²	2,482	151.9
21	56.0	37.0		129	14.6	2.0	119.1				0.00
,	0	G	1. 01 × 001	169	18.4	28	119.4	52.5	6.15×10^{-2}	2,610	175.0
7 5	58.2	30.2	10.3 × 10-2	919	22.6	29	120.8	52.2	6.22×10^{-2}	2,813	0.671
23	60.3	39.3	u	866	29.7	09	122.2	52.0	6.29×10^{-2}	3,050	1.161
24	62.5	40.4	9.30 × 10	415	39.8	61	123.5	51.7	6.40×10^{-2}	3,260	208.6
22	64.7	41.6	9.58 × 10	C 1 6 1	20.0	65	124.8	51.3	6.51×10^{-2}	3,380	220.0
56	66.7	42.4	9.31 × 10 °	555	17:0	: 5	126.2	51.0	6.62×10^{-2}	3,460	229.1
27	68.6	43.3	9.03×10^{-2}	676	1.10	3 4	197.5	50.6	6.73×10^{-2}	3,580	241.1
28	70.6	44.2	8.76×10^{-2}	828	72.5	5 5	0.121	2.03	6.85×10^{-2}	3,780	258.9
29	72.6	45.1	8.48×10^{-2}	1,013	80.0	6	130 0	49.7	7.00×10^{-2}	3,860	270.4
30	74.6	45.9	8.21×10^{-2}	1,256	103.1	00	136.0		7	e e	₽ \$ 66
;	i	9 9 9	5-00 × 10 8	1.536	122.8	67	131.3	49.3	7.16 × 10 -	3,620	2.0.7
31	76.4	40.0 0	0.00 × 10 -2	1 872	145.8	89	132.5	48.8	7.31×10^{-3}	3,820	7 606
33	78.2	47.2	7.79 × 10	1010	165.6	69	133.7	48.2	7.47×10^{-4}	3,780	¥.707
33	80.0	47.9	7.59 × 10	201,2	180 5	20	135.0	47.8	7.63×10^{-2}	3,700	282.2
34	81.9	48.6	7.38 × 10 -	2,446	164.7	: =	136.1	47.2	7.82×10^{-1}	3,500	273.7
35	83.7	49.2	7.17×10^{-2}	2,714	1.4.1	: 2	137.3	46.5	8.02×10^{-2}	3,218	257.9
36	85.4	49.7	7.03 × 10	2,984	0.607		138.5	45.9	8.21×10^{-1}	2,929	240.5
37	87.1	50.1	6.89×10^{-1}	3,274	6.622	2. 4.	139.6	45.3	8.40×10^{-2}	2,612	219.5
38	88.8	9.09	6.74×10^{-2}	3,687	0.047	: 1	140.8	44.7	8.60×10^{-1}	2,373	204.1
33	90.5	51.0	6.60 × 10 -	4,004	2.0.1	?			1-01 > 00 0	2.161	190.9
•	6 60	5	6.46×10^{-2}	4,414	284.9	92	141.9	44.0	2-01 × 50 0	696	178.4
;	7:76	31.5	3.7	4,531	288.6	77	143.0	43.2	9.06 × 10	1.698	157.7
4.	9.50	0.10		4.510	283.4	48	144.0	42.5	9.29 × 10	067.	141.9
7	C.CP	0.10	6 20 × 10 -2	4.534	281.0	19	145.1	41.8	9.52 × 10	95.1	112.2
	1.16	3 4		4.622	282.4	98	146.2	41.0	9.75 × 10		82.5
7	.00.	0.75	5.02 × 10 -2	4.724	284.4	81	147.2	40.5		1 0 1 0	61.5
45	100.3		2-01 × 70-3	4 220	285.6	82	148.2	39.4	×	900	48.6
46	101.9		5.55 × 10 -1	4 686	279.1	83	149.2	38.6	10.7×10	0C#	2
47	103.4		3.30 × 10	4.66	264.2						
ď	501	61	2.82 × 10	704.	7:107						

TABLE A.13 SHOT ZUNI, ROUND 3B, QE 55 DEGREES

	Time	Kange	Altitude	Factor	Reading	Concentration	Time	Range	Altitude	Factor	Reading	Concentration
10.11				, / 8. //- /h)	4	6m/3m	9	1001	10, 11	(mc/m ₃)/(r/hr)	r/hr	mc/m³
27.7 25.4 11.0. 15.2 56 118.3 90.9 50.0 10.0 15.2 56 118.3 90.9 50.0 10.0 15.2 56 118.3 91.9 65.0 10.0 15.2 56.0 10.0 15.3 25.0 10.0 1	2	10.		(mc/m)/ (n/m)				. !	;	- 00		1 46
9.03 3.01,1 3.01,2 3.01,1 3.01,2 3.01,1 3.01,2 3.01,1 3.01,2 3.01,1 3.01,2 <th>12</th> <td>21.1</td> <td>29.4</td> <td></td> <td>105</td> <td>15.3</td> <td>95</td> <td>116.3</td> <td>6.06 6.06</td> <td>6.82 × 10</td> <td>212</td> <td>C</td>	12	21.1	29.4		105	15.3	95	116.3	6.06 6.06	6.82 × 10	212	C
3.5.5 3.4.7 1.0.0 1.0.4 3.5.5 1.0.4 3.5.5 1.0.4 1.0.5 <th< td=""><th>::</th><td>30.3</td><td>32.1</td><td></td><td>168</td><td>22.2</td><td>57</td><td>118.1</td><td>91.4 •</td><td>6.65 × 10</td><td>102</td><td>8.7</td></th<>	::	30.3	32.1		168	22.2	57	118.1	91.4 •	6.65 × 10	102	8.7
35.4 35.3 112.0 50.4 11.5 50.4 50.4 50.5 51.2 50.4 60.5 <t< td=""><th>7</th><td>32.9</td><td>7.7</td><td></td><td>238</td><td>28.8</td><td>28</td><td>119.9</td><td>91.9</td><td>6.50 × 10</td><td>961</td><td>1.21</td></t<>	7	32.9	7.7		238	28.8	28	119.9	91.9	6.50 × 10	961	1.21
9.1. 9.2. 9.2. <th< td=""><th>52</th><td>35.6</td><td>37.3</td><td></td><td>375</td><td>42.0</td><td>28</td><td>121.7</td><td>92.4</td><td>6.29 × 10</td><td>161</td><td>07.7</td></th<>	52	35.6	37.3		375	42.0	28	121.7	92.4	6.29 × 10	161	07.7
4.1	91	37.8	39.5		504	51.7	3	123.5	92.8	6.05 × 10	091	60.1
42.4 43.8 68.6 68.1 12.1 43.5 58.8 12.1 43.5 58.8 12.1 43.5 58.8 12.1 43.5 58.8 12.1 13.0 64.2 13.0 64.1 13.0 65.2 10.1 11.0 11.0 65.0 14.2 94.5 5.82 × 10 - 1 15.0 15.2 13.0 65.0 13.0 94.2 5.82 × 10 - 1 15.0 15.	-	40.1	41.6		909	58.0	61	125.3	93.2	5.92 × 10	8) ;	B) :
44.7 46.0 62.0 8.9.3 65.3 182.9 94.2 5.27×10************************************	: =	42.4	43.8	×	629	58.6	9 2	127.1	93.5	5.82×10^{-3}	172	90:1
4.0 4.1 17.2 × 10 - 1 1.130 6.0 6.1 113.6 94.2 5.5 × 10 15.9 15.	9 9		74.0	×	845	69.3	63	128.9	93.8	5.72 × 10 -3	165	0.949
45.1 65.2 65.2 11.0 11.2 65.1 11.2 65.2 11.0 11.0 11.0 11.0 65.1 11.0 65.1 11.0 65.1 11.0 65.1 11.0 65.1 11.0 65.1 11.0 65.1 11.0 65.2 65.1 65.2 <th< th=""><th>2 8</th><th>•</th><th></th><th>. *</th><th>1.130</th><th>85.0</th><th>\$</th><th>130.6</th><th>94.2</th><th>5.62×10^{-3}</th><th>159</th><th>0.897</th></th<>	2 8	•		. *	1.130	85.0	\$	130.6	94.2	5.62×10^{-3}	159	0.897
51.3 51.6 51.2 51.4 51.6 51.7 51.4 52.4 51.4 51.4 52.4 51.4 50.4 50.4 50.4 50.4 50.4 50.4 <th< th=""><th>8 1</th><th>. ·</th><th>7 6</th><th></th><th>1 402</th><th>97.4</th><th>65</th><th>132.4</th><th>94.5</th><th>5.51×10^{-3}</th><th>153</th><th>0.847</th></th<>	8 1	. ·	7 6		1 402	97.4	65	132.4	94.5	5.51×10^{-3}	153	0.847
5.4.4 5.5.4 5.2.4 1.25.5 67 136.0 94.8 5.41 × 10 - 1 135 66 137.8 5.5.4 5.41 × 10 - 1 135 66 137.8 5.5.4 137.8 5.41 × 10 - 1 135 66 137.8 5.5.4 137.8 5.5.4 137.8 135 135 135 135 135 135 135 135 135 135 137 135 137 135 137 135 137 135 137	72 5		, <u>,</u>		1.760	112.1	9	134.2	9 . 6	5.46×10^{-3}	147	0.802
53.4 53.1 53.4 10.2 13.5 53.5 55.2 53.4 10.2 13.5 53.2 53.2 53.4 10.2 13.5 53.2 53.2 53.2 53.2 10.2 113.2 60.2 53.2 10.2 113.2 60.2 53.2 10.2 113.2 13.4 13.4 95.3 5.25 × 10.2 113.2 63.2 53.2 10.2 113.2 63.2 53.2 10.2 113.2 10.2 <th>7,</th> <th>7.10</th> <th></th> <th></th> <th></th> <th>9 00 1</th> <th>. 4</th> <th>136.0</th> <th>3</th> <th>×</th> <th>141</th> <th>0.764</th>	7,	7.10				9 00 1	. 4	136.0	3	×	141	0.764
8.5.4 52.1 10.2 60 13.2 65.1 5.1 17.2 1	23	53.4	53. 6	×	2,237	6.621	5 6	200	9	×	135	0.724
91.6 51.3 41.3 10.2.1 90.1 51.3 51.3 51.5 11.3 95.3 5.5% (10-1) 11.3 6.1.6 66.4 41.1 x 10-1 3,466 186.7 71 144.0 95.3 5.5% (10-1) 11.3 6.1.6 60.4 41.1 x 10-1 3,575 12.4 72 144.6 95.3 5.5% x 10-1 11.3 6.2.6 62.2 31.7 x 10-1 3,575 12.4 72 144.6 95.3 5.5% x 10-1 11.1 10.7 6.3. 6.1.6 31.7 x 10-1 1,390 58.0 75 11.8 95.2 5.5% x 10-1 11.1 10.7 7.1.6 6.2. 31.7 x 10-1 1,450 38.0 76 11.1 95.2 5.5% x 10-1 11.1 10.7 7.1.6 6.2. 31.1 41.4 41.4 41.4 41.4 41.4 41.4 41.4 41.4 41.4 41.4 41.4 41	54	55.5	55.4	×	2,670	139.2	8 8	0.751	9	5 31 × 10 -1	129	0.685
6.6.6 6.4.4 41.13 × 10 ⁻¹ 3.682 16.2 71 143.0 95.3 5.25 × 10 ⁻¹ 119 0 6.1.6 6.0.4 41.11 × 10 ⁻¹ 3.682 155.4 77 144.6 95.3 5.25 × 10 ⁻¹ 119 6.3.7 6.3.6 6.3.7 6.3.7 13.0 4.3.3 10.0 111 0 6.7.7 6.3.6 6.3.7 6.3.7 144.8 95.3 5.25 × 10 ⁻¹ 101 6.3.7 6.3.6 6.3.6 7.4 148.3 95.3 5.25 × 10 ⁻¹ 107 6.3.7 6.6.6 6.5.0 2.2.7 7.4 148.3 95.3 5.25 × 10 ⁻¹ 107 7.3.6 6.6.6 6.5.0 7.7 155.4 7.7 155.4 9.2 5.25 × 10 ⁻¹ 107 7.3.6 6.6.7 7.0 1.5.0 2.2.4 7.7 153.6 9.2 5.25 × 10 ⁻¹ 107 7.3.7 7.2 7.2 7.2 7.2 1.4 <t< th=""><th>25</th><th>57.6</th><th>57.3</th><th>×</th><th>3,178</th><th>152.1</th><th>2 6</th><th>133.0</th><th>, , ,</th><th>5.26 × 10⁻³</th><th>123</th><th>0.646</th></t<>	25	57.6	57.3	×	3,178	152.1	2 6	133.0	, , ,	5.26 × 10 ⁻³	123	0.646
6.1. 6.0.4 4.1.1 × 10 ⁻¹ 3,566 150.7 71 141.0 95.3 5.25 × 10 ⁻¹ 115 65.7 65.7 65.2 65.7 65.2 95.2 95.2 95.2 95.2 95.2 95.2 95.2 9	5 6	9.69	58.9		3,482	154.2	2 ;	141.3	3	07 × 97.5	611	0.625
63.6 62.0 33.7 × 10 ⁻³ 3.745 135.4 72 144.6 95.3 5.25 × 10 ⁻³ 10.7 65.7 65.2 31.1 × 10 ⁻³ 2.57 × 10 ⁻³ 13.745 135.4 72 146.6 65.6 65.6 23.7 × 10 ⁻³ 1.930 25.0 75 151.8 95.3 5.52 × 10 ⁻³ 10.7 65.5 × 10 ⁻³ 11.2 145.0 35.0 76 151.8 95.2 5.52 × 10 ⁻³ 10.7 65.5 × 10 ⁻³ 10.7 7 153.6 95.0 5.50 × 10 ⁻³ 95.0 × 10 ⁻³ 95.	21	61.6	9 0.4		3,666	150.7	1 :	143.0	3.0	01 × 57.5	115	0.605
65.7 63.6 33.7 × 10 ⁻³ 2.575 120.4 77 146.6 35.3 5.25 × 10 ⁻³ 107 69.6 66.6 6.2 2.5 × 10 ⁻³ 1.2870 69.8 74 146.8 35.3 5.25 × 10 ⁻³ 1.00 103 69.6 66.6 6.2 2.5 × 10 ⁻³ 1.450 38.0 77 151.8 95.2 5.30 × 10 ⁻³ 99 103 17.5 69.3 24.1 × 10 ⁻³ 1.450 38.0 77 151.8 95.2 5.30 × 10 ⁻³ 99 103 17.5 69.3 24.1 × 10 ⁻³ 1.01 1.20 2.2 × 10 ⁻³ 1.05 22.4 77 151.8 95.2 5.30 × 10 ⁻³ 99 103 17.5 4 70.7 22.3 × 10 ⁻³ 1.05 22.4 78 155.3 94.8 5.40 × 10 ⁻³ 99 103 17.5 4 70.7 22.3 × 10 ⁻³ 1.05 12.2 × 10 ⁻³ 1.05 1.05 12.2 × 10 ⁻³ 1.05 12	28	63.6	62.0		3,745	135.4	72	144.8	20.7 0.0	01 × 57.5	: =	0.584
67.7 65.2 31.1 × 10 ⁻¹ 2.870 89.3 74 148.3 35.3 5.25 × 10 ⁻¹ 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10	58	65.7	63.6		3,575	120.4	-73	146.6	50.3	5.25 × 10	101	195.0
68.6 68.6 28.5 × 10 ⁻¹ 1,930 55.0 75 150.1 95.3 5.20 × 10 ⁻¹ 10.1 11.6 67.9 26.2 × 10 ⁻¹ 1,450 38.0 77 153.6 95.2 5.30 × 10 ⁻¹ 95 71.6 67.9 26.2 × 10 ⁻¹ 1,215 29.3 77 153.6 95.0 5.35 × 10 ⁻¹ 95 71.7 15.4 70.7 22.3 × 10 ⁻¹ 1,005 22.4 78 155.3 94.8 5.40 × 10 ⁻¹ 95 77.4 77.4 72.1 20.7 × 10 ⁻¹ 1,005 22.4 78 155.3 94.8 5.40 × 10 ⁻¹ 97 77.4 72.1 20.7 × 10 ⁻¹ 1,005 17.8 17.8 19.9 15.4 5.45 × 10 ⁻¹ 87 17.1 17.2 × 10 ⁻¹ 1,005 17.8 17.8 19.9 15.4 5.45 × 10 ⁻¹ 87 17.1 17.2 × 10 ⁻¹ 81 160.8 94.5 5.50 × 10 ⁻¹ 87 17.1 17.2 × 10 ⁻¹ 81 160.8 94.5 5.50 × 10 ⁻¹ 178 160.8 94.5 5.50 × 10 ⁻¹ 178 160.8 94.5 6.50 × 10 ⁻¹ 178 178 178 178 178 178 178 178 178 178	: 5	67.7	65.2		2,870	89.3	74	148.3	95.3	5.25 × 10	701	
71.6 67.9 26.2 × 10 ⁻¹ 1,450 38.0 76 151.8 95.2 5.30 × 10 ⁻¹ 95 73.5 69.3 24.1 × 10 ⁻¹ 1,215 29.3 77 152.6 95.0 5.30 × 10 ⁻¹ 95 75.4 70.7 22.1 × 10 ⁻¹ 1,005 22.4 78 157.1 94.7 5.43 × 10 ⁻¹ 95 77.4 72.1 22.7 × 10 ⁻¹ 165 14.5 16.6 10 ⁻¹ 87 81.2 73.2 19.2 × 10 ⁻¹ 16.8 12.2 81 16.6 94.5 5.60 × 10 ⁻¹ 97 81.2 74.4 17.7 11.7 10.1 684 12.2 81 16.6 94.5 5.60 × 10 ⁻¹ 97 85.0 17.4 16.8 16.6 16.6 95.0 16.6 95.0 5.60 × 10 ⁻¹ 97 86.0 17.2 16.9 16.6 95.0 16.6 93.3 5.90 × 10 ⁻¹ 176 86.0	3 7	9 6 9	99		1,930	55.0	75	120.1	95.3	5.25×10^{-3}	103	2.0
75.4 70.7 22.3 × 10 ⁻¹ 1,215 29.3 77 151.6 95.0 5.35 × 10 ⁻¹ 95 77 15.5 69.3 24.1 × 10 ⁻¹ 1,005 22.4 78 155.3 94.8 5.46 × 10 ⁻¹ 91 77.4 72.1 20.7 × 10 ⁻¹ 859 17.8 79 155.3 94.8 5.46 × 10 ⁻¹ 91 87 17.4 72.1 20.7 × 10 ⁻¹ 859 17.8 79 157.1 94.7 5.46 × 10 ⁻¹ 87 17.4 72.1 20.7 × 10 ⁻¹ 859 17.8 79 157.1 94.7 5.46 × 10 ⁻¹ 87 17.4 72.1 7.4 72.1 20.7 × 10 ⁻¹ 889 17.8 94.2 5.60 × 10 ⁻¹ 81 82.1 15.6 16.6 94.2 5.60 × 10 ⁻¹ 81 82.1 15.6 16.6 94.2 5.60 × 10 ⁻¹ 81 82.5 16.6 19.5 16.6 93.9 5.70 × 10 ⁻¹ 81 82.5 16.6 19.5 16.6 93.9 5.70 × 10 ⁻¹ 81 82.5 16.6 19.5 16.6 19.5 16.6 19.6 16.6 16.6 16.6 16.6 16.6 16.6	; ;	2.50	6.79		1,450	38.0	92	151.8	95.2	5.30×10^{-2}	70 I	0.921
75.4 70.7 22.3 × 10 ⁻³ 859 17.8 78 155.3 94.8 5.40 × 10 ⁻³ 91 91 91.7 7.1 7.1 20.7 × 10 ⁻³ 859 17.8 79 157.1 94.7 5.45 × 10 ⁻³ 87 77.4 72.1 20.7 × 10 ⁻³ 859 17.8 79 157.1 94.7 5.45 × 10 ⁻³ 84 12.2 19.2 × 10 ⁻³ 64 12.2 81 160.6 94.5 5.60 × 10 ⁻³ 84 85.1 75.6 16.6 × 10 ⁻³ 618 10.3 82 162.3 93.9 5.50 × 10 ⁻³ 81 81.8 15.6 × 10 ⁻³ 551 8.61 8.61 83 164.0 93.6 5.00 × 10 ⁻³ 80 85.8 85.8 164.0 93.6 5.00 × 10 ⁻³ 79 86.8 85 167.2 92.9 6.00 × 10 ⁻³ 79 86.8 86.8 167.2 92.9 6.00 × 10 ⁻³ 79 86.8 86.9 163.2 92.5 6.20 × 10 ⁻³ 79 86.9 86.0 13.2 × 10 ⁻³ 409 5.05 89 170.9 92.0 6.00 × 10 ⁻³ 75 86.9 86.0 170.9 92.0 6.00 × 10 ⁻³ 75 86.0 86.0 170.9 92.0 6.00 × 10 ⁻³ 75 86.0 86.0 170.9 92.0 6.00 × 10 ⁻³ 75 86.0 86.0 170.9 92.0 6.00 × 10 ⁻³ 75 86.0 86.0 170.9 92.0 6.00 × 10 ⁻³ 75 86.0 86.0 170.9 92.0 6.00 × 10 ⁻³ 75 86.0 10 ⁻³ 75 86.0 10.7 × 10 ⁻³ 36 3.93 174.4 91.0 6.75 × 10 ⁻³ 75 86.0 10 ⁻³ 75 86.0 10.7 × 10 ⁻³ 36 3.93 174.4 91.0 6.75 × 10 ⁻³ 75 86.0 10 ⁻³ 70 10 ⁻³	3 25	3 5	6.69		1,215	29.3	77	153.6	95.0	5.35×10^{-3}	S.	0.511
75.4 70.7 22.3 × 10 1,003 17.8 79 157.1 94.7 5.45 × 10 - 9 87 17.4 72.1 20.7 × 10 - 1,003 17.8 79 157.1 94.7 5.45 × 10 - 9 84 17.4 72.1 20.7 × 10 - 1 756 14.5 89 15.0 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 93.9 5.70 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 16.2 92.9 6.00 × 10 - 9 82 17.2 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 92.9 92.9 92.9 6.00 × 10 - 9 82 17.2 92.9 92.9 92.9 92.9 92.9 92.9 92.9 9	3					7 00	91	155.3	3	5.40×10^{-3}	91	0.495
77.4 72.1 20.7 × 10 ⁻⁷ 859 11.6 16.6 94.5 5.50 × 10 ⁻⁷ 84 79.3 73.2 19.2 × 10 ⁻⁷ 756 11.8 16.6 94.5 5.50 × 10 ⁻⁷ 82 81.2 73.2 19.2 × 10 ⁻⁷ 618 10.3 82 162.3 93.9 5.70 × 10 ⁻⁷ 80 85.0 × 10 ⁻⁷ 86.1 16.6 × 10 ⁻⁷ 618 10.3 82 162.3 93.9 5.70 × 10 ⁻⁷ 80 85.9 70 × 10 ⁻⁷ 79 86.9 167.5 92.9 6.00 × 10 ⁻⁷ 79 86.8 16.9 165.8 92.5 6.23 × 10 ⁻⁷ 79 86.8 16.0 13.2 × 10 ⁻⁷ 444 5.88 86 86 168.2 92.5 6.23 × 10 ⁻⁷ 76 82.5 81.0 12.3 × 10 ⁻⁷ 409 5.05 87 170.9 92.0 6.00 × 10 ⁻⁷ 76 82.2 81.0 12.3 × 10 ⁻⁷ 409 5.05 87 170.9 92.0 6.46 × 10 ⁻⁷ 76 82.2 81.0 12.3 × 10 ⁻⁷ 381 4.47 88 172.6 91.0 6.46 × 10 ⁻⁷ 74 81 72.6 × 10 ⁻⁷ 74 81 72.6 × 10 ⁻⁷ 74 82.2 × 10 ⁻⁷ 75 76 × 10 ⁻⁷ 75 76 × 10 ⁻⁷ 77 × 10 ⁻⁷	¥	15.4	70.7	×	C00'T	1 .77	2.2	1691	*	5.45 × 10 -2	87	0.479
19.3 73.2 19.2 × 10 ⁻² 756 14.5 64 12.2 81 160.6 94.2 5.60 × 10 ⁻³ 81 83.1 74.4 17.7 10.6 41.5 × 10 ⁻³ 684 12.2 81 162.3 93.9 5.60 × 10 ⁻³ 81 85.0 76.0 14.5 × 10 ⁻³ 684 10.3 164.0 93.6 5.60 × 10 ⁻³ 80 86.9 78.0 14.5 × 10 ⁻³ 48 5.88 16.0 92.9 6.00 × 10 ⁻³ 79 86.8 73.0 13.9 44 5.88 86 165.2 92.9 6.00 × 10 ⁻³ 79 90.6 80.0 13.2 × 10 ⁻³ 444 5.88 86 160.2 92.9 6.00 × 10 ⁻³ 76 90.6 80.0 11.7 × 10 ⁻³ 361 4.47 88 172.6 91.5 6.68 × 10 ⁻³ 76 94.0 80.0 11.7 × 10 ⁻³ 36 3.93 <td< th=""><th>35</th><th>17.4</th><th>72.1</th><th>×</th><th>500</th><th>97.1</th><th>2 8</th><th>4:101</th><th>46</th><th>5.50 × 10⁻¹</th><th>84</th><th>0.461</th></td<>	35	17.4	72.1	×	500	97.1	2 8	4:101	46	5.50 × 10 ⁻¹	84	0.461
81.2 74.4 17.7 x 10 ⁻¹ 684 12.2 93.9 5.70 x 10 ⁻¹ 81 65.6 85.1 16.2 93.9 5.70 x 10 ⁻¹ 81 65.6 85.1 16.2 93.9 5.70 x 10 ⁻¹ 85.1 16.2 16.2 16.2 93.9 5.70 x 10 ⁻¹ 86.5 16.5 16.2 93.9 5.70 x 10 ⁻¹ 86.5 16.5 16.2 93.9 5.70 x 10 ⁻¹ 86.5 16.5 16.2 93.9 5.70 x 10 ⁻¹ 79 66.8 86.8 16.2 92.9 6.00 x 10 ⁻¹ 76 6.00 x 10 ⁻¹ 17.8 80.0 13.2 x 10 ⁻¹ 444 5.88 86 18.2 92.5 6.23 x 10 ⁻¹ 76 6.00 x 10 ⁻¹ 17.8 10 ⁻¹ 17.1 17.8 10 ⁻¹ 17.9 17.8 17.8 17.8 17.8 17.8 17.8 17.8 17.8	8	19.3	13.2	×	90	C	3 5	160.6		5.60 × 10 -1	82	0.463
85.0 76.6 16.6 × 10 ⁻² 551 10.3 92.1 10.3 92.5 5.80 × 10 ⁻³ 79 86.6 16.5 8 93.3 5.90 × 10 ⁻³ 79 86.6 16.5 8 93.3 5.90 × 10 ⁻³ 79 86.6 16.5 8 93.3 5.90 × 10 ⁻³ 79 86.6 16.5 8 93.3 5.90 × 10 ⁻³ 78 86.6 16.5 8 92.5 6.00 × 10 ⁻³ 76 80.6 13.2 × 10 ⁻³ 464 5.88 86 168.2 92.5 6.00 × 10 ⁻³ 76 82.5 81.0 13.2 × 10 ⁻³ 469 5.05 87 170.9 92.0 6.00 × 10 ⁻³ 75 82.5 81.0 11.7 × 10 ⁻³ 36 3.93 87 170.9 92.0 6.45 × 10 ⁻³ 75 84.3 82.0 11.7 × 10 ⁻³ 36 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 72 89.0 17.2 × 10 ⁻³ 32 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 72 89.0 176.1 90.4 6.75 × 10 ⁻³ 72 89.0 176.1 90.4 6.75 × 10 ⁻³ 72 80.4 6.75 × 10 ⁻³ 72 80.4 6.75 × 10 ⁻³ 72 80.7 10 ⁻³ 72	33	81.2	74.4	×	684	7.71	:	16.3	6 6	5.70 × 10 -3	81	0.465
85.0 78.8 15.6 × 10 ⁻³ 551 84.1 15.8 93.3 5.90 × 10 ⁻³ 79 88.8 86.8 187.8 93.3 5.90 × 10 ⁻³ 78 88.8 86.1 189.2 92.5 6.23 × 10 ⁻³ 76 88.8 86.1 189.2 92.5 6.23 × 10 ⁻³ 76 82.3 10 ⁻³ 76 82.3 10 ⁻³ 74 444 5.88 86.1 189.2 92.5 6.23 × 10 ⁻³ 76 82.3 10 ⁻³ 74 10 ⁻³ 82.0 13.2 × 10 ⁻³ 361 4.47 88 172.6 91.5 6.61 × 10 ⁻³ 74 17.8 10 ⁻³ 361 4.47 88 172.6 91.5 6.61 × 10 ⁻³ 74 10 ⁻³ 98.0 83.0 10.7 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 73 101.7 81.9 91.0 174.4 91.0 6.75 × 10 ⁻³ 72 101.7 85.4 9.69 × 10 ⁻³ 350 3.19 92 174.4 91.0 6.75 × 10 ⁻³ 66 91.9 101.7 85.4 9.69 × 10 ⁻³ 378 3.19 92 176.1 88.7 7.76 × 10 ⁻³ 66 101.7 85.4 9.69 × 10 ⁻³ 2.83 93.1 107.8 89.9 7.66 × 10 ⁻³ 64 103.6 86.3 89.6 8.7 × 10 ⁻³ 64 103.6 81.4 8.7 × 10 ⁻³ 64 103.0 88.4 7.92 × 10 ⁻³ 2.83 2.40 94 108.9 86.0 81.5 × 10 ⁻³ 40 10.9 88.4 7.92 × 10 ⁻³ 2.83 2.40 94 108.0 85.9 91.7 × 10 ⁻³ 40 110.9 89.1 7.54 × 10 ⁻³ 2.83 2.01 99 191.3 84.3 9.91 × 10 ⁻³ 38 112.7 89.7 × 10 ⁻³ 2.83 10.9 10.9 191.3 84.3 9.91 × 10 ⁻³ 35 114.5 90.4 13.0 99 191.3 84.3 10.39 × 10 ⁻³ 35 114.5 90.4 10.39 × 10 ⁻³ 35 114.5 90.4 10.39 × 10 ⁻³ 35 114.5 90.4 10.39 × 10 ⁻³ 35	8	83.1	15.6		618	10.3	3 6	1640	9 6	5.80 × 10 -3	98	0.466
86.9 78.0 14.5 × 10 ⁻³ 515 7.45 95 167.5 92.9 6.00×10 ⁻³ 78 88.8 79.0 13.2 × 10 ⁻³ 444 5.88 86 189.2 92.5 6.00×10 ⁻³ 76 90.6 80.0 13.2 × 10 ⁻³ 444 5.88 86 182.2 92.5 6.00×10 ⁻³ 76 90.6 80.1 12.3 × 10 ⁻³ 381 4.47 88 172.6 91.5 6.61×10 ⁻³ 74 94.3 82.0 10.7 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75×10 ⁻³ 72 94.2 83.0 10.7 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75×10 ⁻³ 72 94.2 83.0 10.2 × 10 ⁻³ 356 3.59 3.19 91.1 174.4 91.0 6.75×10 ⁻³ 72 94.2 83.0 10.2 3.10 2.89 92 174.4 91.0 6.75×10 ⁻³ 6.4 <t< th=""><th>2</th><th>95.0</th><th>36.8</th><th></th><th>551</th><th>19.6</th><th>3 3</th><th>166.0</th><th>9.00</th><th>5.90 × 10 -3</th><th>46</th><th>0.467</th></t<>	2	95.0	36.8		551	19.6	3 3	166.0	9.00	5.90 × 10 -3	46	0.467
88.8 79.0 13.9 × 10 ⁻³ 480 6.68 85 169.2 92.5 6.23 × 10 ⁻³ 76 90.6 80.0 13.2 × 10 ⁻³ 444 5.68 86 169.2 92.5 6.23 × 10 ⁻³ 75 90.6 80.0 13.2 × 10 ⁻³ 444 5.05 87 172.6 92.0 6.46 × 10 ⁻³ 74 94.3 82.0 11.7 × 10 ⁻³ 361 4.47 88 172.6 91.5 6.61 × 10 ⁻³ 74 94.3 82.0 11.7 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 72 99.0 84.6 9.69 × 10 ⁻³ 72 89.9 92 174.8 89.9 7.26 × 10 ⁻³ 64 99.9 177.8 89.9 7.26 × 10 ⁻³ 64 101.7 86.4 9.30 × 10 ⁻³ 310 2.89 92 179.5 89.3 7.46 × 10 ⁻³ 64 101.7 86.4 87.1 8.47 × 10 ⁻³ 293 2.40 94 182.9 88.0 81.5 × 10 ⁻³ 57 105.4 87.1 8.47 × 10 ⁻³ 293 2.40 94 182.9 88.0 81.5 × 10 ⁻³ 53 100.2 100.3 86.4 87.1 8.47 × 10 ⁻³ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻³ 40 110.9 89.1 7.54 × 10 ⁻³ 253 2.01 96 186.3 86.5 85.9 9.17 × 10 ⁻³ 42 112.7 89.7 7.32 × 10 ⁻³ 221 1.74 98 189.6 85.1 9.42 × 10 ⁻³ 38 112.7 89.7 7.06 × 10 ⁻³ 212 1.50 193.0 83.5 10.39 × 10 ⁻³ 35	2	86.9	78.0		cIc.	6.43 0.00	• •		0 00	6 00 × 10 -1	78	0.468
90.6 80.0 13.2 × 10 ⁻¹ 444 5.88 90 170.9 92.0 6.46 × 10 ⁻¹ 75 92.5 81.0 12.3 × 10 ⁻¹ 409 5.05 87 170.9 92.0 6.46 × 10 ⁻¹ 74 94.3 82.0 11.7 × 10 ⁻¹ 361 4.47 88 172.6 91.5 6.61 × 10 ⁻¹ 73 94.2 82.0 10.7 × 10 ⁻¹ 366 3.93 89 174.4 91.0 6.75 × 10 ⁻¹ 72 94.0 83.6 10.2 × 10 ⁻¹ 350 3.58 90 174.4 91.0 6.75 × 10 ⁻¹ 72 94.0 83.6 10.2 × 10 ⁻¹ 350 3.58 90 174.4 91.0 6.75 × 10 ⁻¹ 68 95.0 84.6 9.69 × 10 ⁻¹ 350 3.18 91 177.8 89.9 7.26 × 10 ⁻¹ 66 101.7 85.4 9.30 × 10 ⁻¹ 310 2.89 92 179.5 89.9 7.46 × 10 ⁻¹ 60 102.6 86.3 8.96 × 10 ⁻¹ 293 2.40 94 182.9 88.0 8.15 × 10 ⁻¹ 57 103.6 86.3 8.96 × 10 ⁻¹ 293 2.40 94 182.9 88.0 8.15 × 10 ⁻¹ 60 105.4 87.1 8.47 × 10 ⁻¹ 293 2.40 94 182.9 88.0 8.15 × 10 ⁻¹ 49 107.2 87.8 8.26 × 10 ⁻¹ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻¹ 49 110.9 89.1 7.54 × 10 ⁻¹ 2.48 1.87 97 186.0 85.9 9.17 × 10 ⁻¹ 42 111.7 89.7 7.32 × 10 ⁻¹ 2.1 1.50 99 191.3 84.3 9.91 × 10 ⁻¹ 35 114.5 90.4 7.06 × 10 ⁻¹ 2.1 1.50 100 133.0 83.5 10.39 × 10 ⁻¹ 35	7	86,8	79.0		98	90.0	2 3	160.5		6.23 × 10 ⁻¹	16	0.478
92.5 81.0 12.3 × 10 ⁻³ 409 5.05 87 170.5 91.5 6.61 × 10 ⁻³ 74 94.3 82.0 11.7 × 10 ⁻³ 361 4.47 88 172.6 91.5 6.61 × 10 ⁻³ 72 94.2 83.0 10.7 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 72 96.0 83.0 10.2 × 10 ⁻³ 350 3.58 90 176.1 90.6 6.97 × 10 ⁻³ 72 101.7 85.4 9.00 × 10 ⁻³ 310 2.89 92 179.5 89.3 7.46 × 10 ⁻³ 66 101.7 85.4 9.00 × 10 ⁻³ 293 2.62 93 181.2 88.7 7.76 × 10 ⁻³ 57 105.4 86.5 8.00 × 10 ⁻³ 293 2.40 94 182.9 88.7 7.76 × 10 ⁻³ 53 107.2 87.8 8.26 × 10 ⁻³ 2.74 2.27 96 186.3 8.96 8.72 × 10 ⁻³ 40	42	9 0. 6	80.0		Ŧ	9.68	0 0	1 00		6.46 × 10 -3	75	0.488
94.3 82.0 11.7 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 72 98.0 83.6 10.2 × 10 ⁻³ 366 3.93 89 174.4 91.0 6.75 × 10 ⁻³ 72 98.0 83.6 10.2 × 10 ⁻³ 356 3.19 91 171.8 89.9 7.26 × 10 ⁻³ 64 99.9 84.6 9.69 × 10 ⁻³ 328 3.19 92 179.5 89.3 7.46 × 10 ⁻³ 64 101.7 85.4 9.90 × 10 ⁻³ 293 2.62 93 181.2 88.7 7.76 × 10 ⁻³ 64 105.4 87.1 8.47 × 10 ⁻³ 293 2.40 94 182.9 88.0 8.15 × 10 ⁻³ 57 105.4 87.1 8.47 × 10 ⁻³ 293 2.40 94 182.9 88.0 8.15 × 10 ⁻³ 57 109.0 88.4 7.92 × 10 ⁻³ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻³ 51 110.9 89.1 7.54 × 10 ⁻³ 2.53 2.01 96 186.3 86.6 85.1 9.42 × 10 ⁻³ 46 112.7 89.7 7.32 × 10 ⁻³ 2.37 1.74 98 191.3 84.3 9.91 × 10 ⁻³ 38 114.5 90.4 7.06 × 10 ⁻³ 212 1.50 100 193.0 83.5 10.39 × 10 ⁻³ 35	7	92.5	81.0	×	609	 	6 6	139.6	5	6.61 × 10 ⁻³	75	0.491
94.2 63.0 10.7 × 10 ⁻¹ 366 3.93 89 174.4 91.0 6.75× 10 ⁻¹ 73 96.0 63.8 10.2 × 10 ⁻¹ 350 3.58 90 176.1 90.6 6.97× 10 ⁻¹ 73 99.9 64.6 9.69× 10 ⁻¹ 32.8 3.19 91 177.8 89.9 7.26× 10 ⁻¹ 66 101.7 85.4 9.00× 10 ⁻¹ 310 2.89 92 178.5 89.3 7.46× 10 ⁻¹ 66 103.6 86.3 8.96× 10 ⁻¹ 293 2.62 93 187.2 88.7 7.76× 10 ⁻¹ 60 105.4 86.3 8.00× 10 ⁻¹ 2.27 94 182.9 80.0 8.15× 10 ⁻¹ 53 109.0 86.4 7.92× 10 ⁻¹ 253 2.01 96 186.3 86.6 8.75× 10 ⁻¹ 40 110.9 89.1 7.52× 10 ⁻¹ 23 1.74 98 186.3 86.3 9.91× 10 ⁻¹ 35 114.5 90.4 </th <th>Ŧ</th> <th>ĭ</th> <th>82.0</th> <th>×</th> <th>38.</th> <th>7.</th> <th>0</th> <th></th> <th>:</th> <th>1</th> <th>;</th> <th>707 0</th>	Ŧ	ĭ	82.0	×	38.	7.	0		:	1	;	707 0
94.0 63.6 10.2 × 10 ⁻¹ 350 3.58 90 176.1 90.6 6.97 × 10 7/2 95.9 64.6 9.69 × 10 ⁻¹ 328 3.19 91 177.8 89.9 7.26 × 10 ⁻¹ 66 101.7 65.4 9.30 × 10 ⁻¹ 310 2.89 92 179.5 86.7 7.76 × 10 ⁻¹ 66 105.4 87.1 8.47 × 10 ⁻¹ 29.3 2.62 93 182.9 86.0 8.15 × 10 ⁻¹ 57 105.4 87.1 8.47 × 10 ⁻¹ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻¹ 53 107.2 87.8 8.26 × 10 ⁻¹ 274 2.27 95 186.6 87.4 8.37 × 10 ⁻¹ 53 110.9 89.1 7.54 × 10 ⁻¹ 2.53 2.01 96 186.3 86.6 87.2 × 10 ⁻¹ 46 110.9 89.7 7.52 × 10 ⁻¹ 2.37 1.74 98 181.3 84.3 9.91 × 10 ⁻¹ 35 114.5 90.4 7.06 × 10 ⁻¹ 212 1.50 193.0 83.5 10.39 × 10 ⁻¹ 35	•	3			366	3.93	68	174.4	91.0	6.75 × 10	2 6	10.00 10.00
99.9 84.6 9.69 × 10 ⁻³ 328 3.19 91 177.8 89.9 7.26 × 10 ⁻³ 64 101.7 85.4 9.30 × 10 ⁻³ 293 2.62 93 181.2 88.7 7.46 × 10 ⁻³ 64 103.6 86.3 8.96 × 10 ⁻³ 293 2.62 93 181.2 88.7 7.76 × 10 ⁻³ 64 105.4 87.1 8.47 × 10 ⁻³ 293 2.40 94 182.9 86.0 8.15 × 10 ⁻³ 57 107.2 87.8 8.26 × 10 ⁻³ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻³ 53 109.0 86.4 7.92 × 10 ⁻³ 253 2.01 96 186.0 85.9 9.17 × 10 ⁻³ 46 110.9 89.1 7.54 × 10 ⁻³ 248 1.87 97 186.0 85.9 9.17 × 10 ⁻³ 46 112.7 89.7 7.32 × 10 ⁻³ 2.37 1.74 98 189.6 85.1 9.92 × 10 ⁻³ 38 114.5 90.4 7.06 × 10 ⁻³ 212 1.50 190 193.0 83.5 10.39 × 10 ⁻³ 35	; ;			10.2 × 10 -1	350	3.58	8	176.1	9 .	6.97 × 10	2 9	100.0
101.7 85.4 9.30 × 10 ⁻³ 310 2.89 92 179.5 89.3 7.46 × 10 ⁻³ 60 101.7 85.4 8.56 × 10 ⁻³ 293 2.62 93 181.2 88.7 7.76 × 10 ⁻³ 57 103.6 86.3 8.66 × 10 ⁻³ 293 2.40 94 182.9 88.0 8.15 × 10 ⁻³ 57 105.4 87.1 8.47 × 10 ⁻³ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻³ 53 107.2 87.8 8.26 × 10 ⁻³ 274 2.27 95 184.6 87.4 8.37 × 10 ⁻³ 49 109.0 88.4 7.92 × 10 ⁻³ 253 2.01 96 186.3 86.6 87.2 × 10 ⁻³ 46 110.9 89.1 7.54 × 10 ⁻³ 2.48 1.87 97 189.6 85.1 9.42 × 10 ⁻³ 42 112.7 89.7 7.32 × 10 ⁻³ 2.37 1.74 98 181.6 85.1 9.91 × 10 ⁻³ 38 114.5 90.4 7.06 × 10 ⁻³ 212 1.50 100 133.0 83.5 10.39 × 10 ⁻³ 35	: :	è	2	9 64 × 10 -3	328	3.19	16	177.8	89.9	7.26×10^{-3}	2 :	264.0
103.4 86.3 8.96 × 10 - 3 293 2.62 93 181.2 88.7 7.76 × 10 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	; ;	n	9.10	9 30 × 10 -8	310	2.89	95	179.5	89.3	7.46 × 10	5 9	0.481
105.4 87.1 8.47×10 ⁻³ 283 2.40 94 182.9 88.0 8.15×10 ⁻³ 51 105.4 87.1 8.46×10 ⁻³ 274 2.27 95 184.6 87.4 8.37×10 ⁻³ 53 107.2 87.8 8.26×10 ⁻³ 253 2.01 96 186.3 86.6 8.72×10 ⁻³ 46 110.9 89.1 7.54×10 ⁻³ 248 1.87 97 186.0 85.9 9.17×10 ⁻³ 46 112.7 89.7 7.32×10 ⁻³ 2.37 1.74 98 191.3 84.3 9.91×10 ⁻³ 38 114.5 90.4 7.06×10 ⁻³ 212 1.50 190 193.0 83.5 10.39×10 ⁻³ 35	2 :	101.		2-02 × 96 ×	293	2.62	93	181.2	88.7	7.76 × 10 -	3 5	211.0
107.2 87.8 8.26 × 10 - 3 2.74 2.27 95 184.6 87.4 8.37 × 10 - 3.3 × 10 - 3.4 × 10.7.2 87.8 8.26 × 10 - 3 2.01 96 186.3 86.6 87.4 10 - 3 4.9 × 109.0 89.1 7.54 × 10 - 3 2.48 1.87 97 186.0 85.1 9.42 × 10 - 3 4.0 × 10.9 89.7 7.32 × 10 - 3 2.37 1.74 99 191.3 84.3 9.91 × 10 - 3 38 118.5 90.4 7.06 × 10 - 3 2.12 1.50 193.0 83.5 10.39 × 10 - 3 35	2 :	905.		8 47 × 10 -3	283	2.40	₹	182.9	88.0	8.15 × 10 -1	i i	0.400
109.0 88.4 7.92 × 10 ⁻³ 253 2.01 96 186.3 86.6 8.72×10^{-3} 45 109.0 88.4 7.92×10^{-3} 248 1.87 97 186.0 85.9 9.17×10^{-3} 46 110.9 89.1 7.54×10^{-3} 237 1.74 98 189.6 85.1 9.42×10^{-3} 42 112.7 89.7 7.32×10^{-3} 237 1.50 99 191.3 84.3 9.91 × 10 ⁻³ 38 114.5 90.4 7.06×10^{-3} 212 1.50 109 193.0 83.5 10.39 × 10 ⁻³ 35	3 :			8 26 × 10 -3	274	2.27	95	184.6	87.4	8.37 × 10 -4	? ?	757 0
110.9 89.1 7.54×10^{-3} 248 1.87 9.7 188.0 85.9 9.17 × 10 46 110.9 89.1 7.32×10^{-3} 237 1.74 98 189.6 85.1 9.42×10^{-3} 42 112.7 89.7 7.32×10^{-3} 237 1.50 99 191.3 84.3 9.91 × 10 ⁻² 38 114.5 90.4 7.06×10^{-3} 212 1.50 100 193.0 83.5 10.39 × 10 ⁻³ 35	7	101.2		7 99 × 10 -1	253	2.01	9 6	186.3	9.98	8.72 × 10 -3	<u>.</u>	6.43
110.9 89.1 7.32×10^{-3} 237 1.74 98 189.6 85.1 9.42×10^{-3} 42 112.7 89.7 7.32×10^{-3} 237 1.50 99 191.3 84.3 9.91×10^{-3} 38 114.5 90.4 7.06×10^{-3} 212 1.50 100 193.0 83.5 10.39 $\times 10^{-3}$ 35	3	0.601		2.54 × 10 -3	248	1.87	63	188.0	85.9	9.17 × 10 -	.	771.0
112.1 63.1 7.06×10^{-3} 212 1.50 99 191.3 84.3 9.91 × 10 38 114.5 90.4 7.06×10^{-3} 212 1.50 100 193.0 83.5 10.39 × 10 ⁻³ 35	23	6.011	1.00	2 39 × 10 -1	237	1.74	98	189.6	85.1	9.42 × 10 -		Fire of
114.5 30.4 10.39 × 10. 35	3	112.7	7.60	()	212	1.50	66	191.3	84.3	9.91 × 10 -		0.383
	S	114.5	#.06	(:		100	193.0	83.5	10.39 × 10		0.363

TABLE A.14 SHOT ZUNI, ROUND 4B, QE 65 DEGREES

Time	Range	Altitude	Factor	wea mig	Collectivities
Sec	103 ft	103 ft	(mc/m ³)/(r/hr)	ւ/հւ	mc/m³
=	191	31.7	132:8 × 10 -1	3	7.97
: 2	21.2	35.0	120.1 × 10 -1	208	25.0
13	23.2	38.2	108.7 × 10 -3	430	4 6.8
	25.3	41.4	96.2 × 10 -	161	73.2
. ب	27.3	44.7	86.0×10^{-1}	1,303	112.0
	29.2	47.5	77.2 × 10 -3	2,187	168.8
	31.1	50.3	68.4 × 10 -1	3,617	247.4
. «	32.9	53.1	59.6 × 10 -3	4,604	274.4
2 5	34.8	55.8	50.8 × 10 -3	3,952	200.9
2 2	36.6	58.6	44.6×10^{-3}	2,215	98.7
_	7 00		39.0 × 10 -1	1,185	46.2
7 6	F 00 0	9 69	33.6 × 10 -1	785	26.4
. .	70.7	66.1	29.4 × 10 ⁻¹	582	17.1
3 3	42.0	68.6	25.2 × 10 -3	471	11.8
, v	4. 7.	71.1	21.9 × 10 ⁻¹	379	8.30
C 1	6.54	73.4	19.0 × 10 -1	314	5.99
9 6	7.1.4	75.6	× 10	274	4.56
. 6	50.7	77.9	14.6 × 10 -1	235	3.43
5.0	52.4	80.2	13.0 × 10 -	201	2.63
30	54.1	82.4	11.3×10^{-1}	183	2.06
;	00 17 17	84.5	9.77×10^{-3}	167	1.64
; ;	57.5	86.6	76 × 10	147	1.29
3 5	59.2	88.6	7.78×10^{-3}	127	0.992
2 5	6.09	90.7	21 ×	120	0.828
5	62.6	92.8	6.08×10^{-3}	120	0.729
36	64.3	94.7	5.45×10^{-3}	120	0.654
33	0.99	9.96	4.86×10^{-3}	120	0.582
38	67.7	5.80	34 ×	109	0.474
39	69.3	100.3	3.99 × 10	5 6	0.394
5	71.0	102.2	3.54 × 10	68	0.317
	72.7	104.0	3.16 × 10 -3	80	0.252
	74.4	105.7	2.89 × 10 -1	90	0.231
1 2	76.0	107.4	2.62 × 10 -1	6	0.209
. +	77.7	109.1	2.34×10^{-3}	80	0.187
5	79.4	110.8	2.15 × 10 ⁻¹	8	0.171
46	81.0	112.4	1.97 × 10 -4	2	0.157
-	82.7	113.9	1.77 × 10 -1	2	0.141
8	84.4	115.5	7 01 × 19 T	2	0.131
6.	86.0	117.0	01 ×	8	27.
			7- VI × 3E I	Š	

TABLE A.15 SHOT NAVAJO, ROUNDS 1A AND 2A, QE 35 DEGREES
Time Range Altitude Factor Reading Concentration

	Time	Range	Altitude	Factor	Reading	Concentration
	39 s	10, ft	10° ft	(mc/m³)/(r/hr)	r/hr	mc/m³
	Round 1A	۲۱				
	24	64.9	25.4	165.9×10^{-3}	3	9.29
	Round 2A	2 A				
	22	61.0	24.4	170.9 × 10-1	2.	12.6
		63.0	24.9	167.8×10^{-3}	91	7.85
	24	64.9	25.4	165.9 × 10 -1	9#	1.67
	25	6.9	25.9	164.4×10^{-3}	45	7.52
	92	68.6	26.2	162.8 × 10 -1	45	7.36
	27	70.3	26.4	160.9×10^{-3}	Į	7.18
	86	71.9	26.7	158.9×10^{-3}	Ŧ	7.01
-	£ 21	73.6	27.0	157.0 × 10 -1	.	6.84
2	J.	75.3	27.3	156.1 × 10 -3	4 3	6.72
so	8 8	76.7	27.4	155.8 × 10 ⁻³	42	6.68
on		78.2	27.5	155.6×10^{-3}	42	6.53
-	33	79.6	27.6	155.3 × 10 ⁻³	51	7.92
2	7	81.0	27.7	155.0×10^{-3}	88	10.54
•	35	82.5	27.8	154.7 × 10 ⁻¹	J	11.76
4	36	83.7	27.7	154.9×10^{-3}	22	8.52
2	3 6	84.9	27.6	155.1×10^{-3}	42	6.51
	:					

TABLE A.16 SHOT NAVAJO ROUND 1B, QE 55 DECREES

1	B and a	Altutude	Factor	Reading	Concentration	Time	Kange	Altitude	Factor	Reading	Concentration
a me	Mailgo						100	103 61	(mc/m ³)/(r/br)	r/hr	mc/m³
208	103 ft	10³ ft	(mc/m ₃)/(r/hr)	r/hr	mc/m	၁ခုန	:	:	7-00 200		1 03
į	,	94	82.0 × 10 ⁻³	29	4.84	61	125.3	93.2	5.92 × 10	* 6	56.0
.	· ·		×	119	8.96	62	127.1	93.5	5.82 × 10 °	0/1	0.330
2.5	0.7	•	×	199	13.8	63	128.9	93.8	5.72×10^{-1}	100	0.00
21	7.7		×	297	18.9	3	130.6	94.2	5.62×10^{-2}	791	0.010
77	51.3	0.10	()	396	22.9	65	132.4	94.5	5.52×10^{-2}	901	0.011
23	53.4	93.0		555	28.9	99	134.2	94.6	5.46×10^{-3}	80	0.063
5 4	55.5	4.60		730	34.9	67	136.0	94.8	5.41×10^{-3}	158	0.034
22	57.	57.3		649	37.8	89	137.8	95.0	5.36×10^{-2}	158	0.846
56	29.6	20.0		010 1	41.5	69	139.5	95.1	5.31×10^{-2}	158	0.838
21	61.6	₹09	41.1 × 10 20 × 10 -3	010,1	42.6	20	141.3	95.3	5.26×10^{-3}	158	0.830
28	63.6	62.0	•		9	ē	143.0	95.3	5.25×10^{-3}	158	0.830
53	65.7	63.6	×	1,270	0.74	2 2	144 8	95.3	5.25×10^{-3}	158	0.830
8	67.7	65.2		1,410	n o	7 5	146.6	95.3	5.25×10^{-3}	158	0.829
. [9.69	9.99	×	1,580	45.0	2 2	140.0	65.9	5.25×10^{-3}	1,58	0.829
32	71.6	67.9	26.2 × 10 -1	1,720	45.0	. .	150.5	95.9	5.25 × 10 ⁻³	158	0.829
	73.5	69.3	24.1 × 10 -1	1,820	43.8	C :	4	6.59	5.30×10^{-3}	158	0.837
3 3	75.4	70.7	22.3×10^{-3}	1,780	39.7	٤ ;	0.161	3.56	5.35 × 10 ⁻³	158	0.845
5 6	17.	7.9.1		1,720	35.6	11	153.6	00.0	\$ 40 × 10 · 3	158	0.853
3 5	- 6	13.5		1,590	30.5	78	155.3	9.4. S	3.40 × 10 -3	355	0.861
3 9	3 6	4 47		1,450	25.7	19	157.1	94.7	5.45 × 10	9 4	0.868
7	2.10	· ·		1.290	21.5	80	158.8	94.5	2.50 × 10	3	
38	83.1	0.0			4	á	160.6	44.9	5.60×10^{-3}	162	0.907
39	85.0	16.8	12.6 × 10 ⁻¹	1,190	10.0	1 6	2001	3 2 3	×	166	0.946
40	86.9	78.0	14.5×10^{-3}	1,010	14.7	7,0	1640	3	5.80×10^{-3}	170	0.985
? ;	8 8 8	19.0	13.9 × 10 -1	930	12.9		101.0		5 40 × 10 -3	174	1.036
;	9 06	80.0	13.2 × 10 ⁻³	832	11.0	4.	0.001	9 5	t-01 × 00 9	178	1.078
; ;	3	0 18		730	9.00	92	167.0	6.26	٠,	190	1.184
2 :		82.0		620	7.26	98	169.2	92.5	6-01 × 20 2	202	1.304
.				574	6.16	87	170.9	92.0	7-01 > 10 0	214	1.413
2 :	9 0	0 0 0 0		493	5.03	88	172.6	31.0	0.01 > 10	226	1.536
4 4	0.00	9 4		469	4.55	68	174.4	91.0	6-13 × 10 -3	238	1.668
7 4	101	4 5 5	9.30 × 10 ⁻³	416	3.87	3	1.76.1	90.06	0.01		1040
ř		}	4	200	. 55	91	177.8	89.9	7.26 × 10 -3	726	1.049
4 9	103.6	86.3	8.96 × 10	956	3 c		179.5	89.3	7.46 × 10 -4	214	1.000
20	105.4	87.1	8.47 × 10	9 9	76.0	93	181.2	88.7	7.76 × 10 -3	202	0.5.1
21	107.2	81.8	8.26 × 10	900		3	182.9	88.0	8.15×10^{-1}	190	ECC.1
25	109.0	6 8.4	7.92 × 10 -	336	10.7	; ;	184.6	87.4	8.37×10^{-3}	178	1.499
53	110.9	89.1	7.54 × 10 ⁻²	316	00.7	96	186.3	86.6	8.72×10^{-3}	208	1.814
24	112.7	89.7	7.32×10^{-3}	296	77.7	3 6	188.0	85.9	9.17×10^{-3}	238	2.183
55	114.5	90.4	7.06×10^{-3}	277	CR:1	, a	9 581	85.1	9.42×10^{-3}	198	1.879
95	116.3	6.06	6.82×10^{-3}	257	97.7	9	191	84.3	9.91×10^{-3}	158	1.571
5.7	118.1	91.4	6.65×10^{-3}	, 237	1.58	66	1930	83.5	10.4×10^{-3}	119	1.246
9 45	119.9	91.9	6.50×10^{-3}	217	1.4.	201	100	968		99	0.656
	121.7	92.4	6.29×10^{-1}	197	1.24	101		•			
; 3	123.5	92.8	6.05×10^{-3}	178	1.08						
١											

TABLE A.17 SHOT NAVAJO, ROUND 2B, QE 65 DEGREES

35.0 120 ¹ 1 36.2 120 ¹ 1 36.2 120 ¹ 1 41.4 96.2 44.7 96.2 44.7 77.2 50.3 68.4 53.1 59.6 61.1 39.0 66.1 29.4 66.1 29.4 66.1 29.4 66.1 20.8 73.6 68.6 73.6 68.6 73.6 69.2 82.4 11.6 80.7 99.7 66.6 80.6 69.7 90.7 66.6 90.7 66.6 90.7 66.6 90.7 66.6 90.7 90.7 66.6 90.7 90.7 66.6 90.7 90.7 66.6 90.7 90.7						
21.2 35.0 120;1 × 10 ⁻¹ 59 23.2 38.2 108.7 × 10 ⁻¹ 59 25.3 44.7 86.0 × 10 ⁻¹ 208 27.3 44.7 86.0 × 10 ⁻¹ 208 27.3 44.7 86.0 × 10 ⁻¹ 378 29.9 53.1 50.3 68.4 × 10 ⁻¹ 702 32.9 53.1 50.8 × 10 ⁻¹ 702 34.8 55.8 5.8 × 10 ⁻¹ 702 25.7 34.8 55.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8						doitestando
21.2 35.0 120.1 \times 10 5.4 10.2 2.4 2.5 2.3 2.1 38.2 108.7 \times 10 -3 5.9 10.0 2.7 3 44.7 86.0 \times 10 -3 20.8 10.0 3.1 29.2 47.6 68.4 \times 10 -3 20.8 10.3 32.9 32.9 55.8 \times 10 -3 20.8 \times 10 -3 20.8 31.1 50.3 68.4 \times 10 -3 20.8 \times 10 -3 20.9 32.9 36.8 5.8 6 44.6 \times 10 -3 20.8 31.1 30.0 \times 10 -3 34.3 38.4 61.1 39.0 \times 10 -3 25.4 43.7 68.6 \times 21.9 \times 21.9 2.0 35.1 44.2 11.1 21.9 \times 21.9 \times 21.9 \times 21.0 \times 22.0 25.1 44.0 \times 22.0 25.1 45.0 \times 22.0 25.1 45.0 \times 22.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0	Time	Hange	Altitude	Factor	Reading	Concentiation
23.2 38.2 108.7 × 10					-4	em/Ju
25.3 41.4 96.2 × 10 10 10 10 10 10 10 10 10 10 10 10 10	3 98	10, u	10, U	(mc/m,)/(r/hr)	L/ur	
27.3 44.7 86.0 × 10 - 208 29.2 47.6 77.2 × 10 - 3 378 30.3 50.3 68.4 × 10 - 3 576 31.1 50.3 55.8 × 10 - 3 727 34.8 55.8 50.8 × 10 - 3 35.7 40.2 65.1 39.0 × 10 - 3 343 41.0 66.1 39.0 × 10 - 3 343 42.0 66.1 39.0 × 10 - 3 264 42.0 66.1 29.4 × 10 - 3 264 43.7 71.1 102.2 32.5 × 10 - 3 254 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.8 86.6 8.76 × 10 - 3 182 55.9 86.6 8.76 × 10 - 3 182 55.9 90.7 6.90 × 10 - 3 192 55.9 10.0 4 3.99 × 10 - 3 59 55.9 10.0 4 3.54 × 10 - 3 53 55.9 10.0 4 2.52 × 10 - 3 53 55.9 10.0 4 2.54 × 10 - 3 53 55.9 112.4 115.5 112.4 43 55.9 113.9 112.4 115.5 116.9			96	120.1 × 10-1	⊕	1.19
29.2 47.6 77.2 × 10 ⁻¹ 378 2.9.2 31.1 50.3 68.4 × 10 ⁻³ 727 35.1 32.9 5.8.4 × 10 ⁻³ 727 35.1 36.8 × 10 ⁻³ 702 25.1 36.4 66.1 39.0 × 10 ⁻³ 24.3 13.4 42.0 66.1 29.4 × 10 ⁻³ 26.4 66.1 49.0 × 10 ⁻³ 26.4 66.1 29.2 × 10 ⁻³ 26.4 66.1 29.2 × 10 ⁻³ 29.4 × 10 ⁻³ 29.4 × 10 ⁻³ 29.4 × 10 ⁻³ 29.4 5.2 × 10 ⁻³ 182 29.4 × 10 ⁻³ 199 2.2 50.7 7.9 14.6 × 10 ⁻³ 199 2.2 50.7 7.9 14.6 × 10 ⁻³ 199 2.2 60.8 × 10 ⁻³ 10.8 60.9 90.7 60.8 × 10 ⁻³ 10.8 90 90.7 60.8 × 10 ⁻³ 90 90 90.6 6.9 6.9 × 10 ⁻³ 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90 90.7 6.90 × 10 ⁻³ 90 90 90 90 90 90 90 90 90 90 90 90 90	12	21.2	9 6	×	38	4.23
31.1 50.3 68.4 × 10 - 3 65.1 44.6 32.9 53.1 59.6 × 10 - 3 727 43.2 34.8 55.8 50.8 × 10 - 3 727 43.2 36.6 58.6 44.6 × 10 - 3 576 25.7 38.4 61.1 39.0 × 10 - 3 270 9.7 42.0 66.1 29.4 × 10 - 3 254 7.7 43.7 68.6 25.2 × 10 - 3 254 7.7 47.2 73.4 19.0 × 10 - 3 254 7.7 47.2 73.4 19.0 × 10 - 3 254 7.7 49.0 77.9 14.6 × 10 - 3 254 5.7 50.7 77.9 14.2 7.7 11.2 7.7 55.8 86.6 8.76 × 10 - 3 11.2 11.2 1.4 59.2 88.6 7.78 × 10 - 3 1.9 1.4 1.1 1.0 60.9 90.7 6.98 × 10 - 3 1.0 1.0 1.0 1.0 1.0	13	23.2	7.00	,	6.5	69.9
32.9 53.1 59.6 × 10 ⁻³ 727 43.2 34.8 55.8 50.8 × 10 ⁻³ 702 35.7 36.6 58.6 × 10 ⁻³ 702 35.7 36.6 58.6 × 10 ⁻³ 776 25.7 40.2 63.6 33.6 × 10 ⁻³ 270 9.7 42.0 66.1 29.4 × 10 ⁻³ 264 6.7 43.7 68.6 25.2 × 10 ⁻³ 254 6.7 49.0 77.9 19.0 × 10 ⁻³ 199 2.2 49.0 77.9 14.6 × 10 ⁻³ 199 2.2 50.7 77.9 14.6 × 10 ⁻³ 199 2.2 50.7 77.9 14.6 × 10 ⁻³ 198 2.2 50.7 86.6 7.78 10 ⁻³ 2.9 2.2 60.9 90.7 6.98 10 ⁻³ 112 112 60.9 90.7 6.98 10 ⁻³	*1	25.3	41.4	()	121	10.4
32.9 55.8 50.8 × 10 - 3 35.8 34.8 55.8 50.8 × 10 - 3 35.6 25.8 36.6 58.6 44.6 × 10 - 3 35.6 25.2 40.2 63.6 33.6 × 10 - 3 25.4 7.7 40.2 66.1 29.4 × 10 - 3 25.4 7.7 47.2 68.6 25.2 × 10 - 3 25.4 5.4 47.2 73.4 19.0 × 10 - 3 19.9 7.7 49.0 75.6 16.6 × 10 - 3 18.2 5.2 50.7 77.9 14.6 × 10 - 3 18.2 5.2 50.7 77.9 14.6 × 10 - 3 112 112 50.7 77.9 14.6 × 10 - 3 112 112 50.7 77.9 14.6 × 10 - 3 112 112 60.9 90.7 6.90 × 10 - 3 142 112 60.9 90.8	15	27.3	44.7		171	12.2
34.8 55.8 50.0 7.0 25.7 36.6 58.6 44.6 × 10 ⁻³ 343 13.4 38.4 61.1 39.0 × 10 ⁻³ 264 7.7 40.2 66.1 29.4 × 10 ⁻³ 264 7.7 42.0 66.1 29.4 × 10 ⁻³ 264 7.7 43.7 66.1 29.2 × 10 ⁻³ 234 6.7 49.0 73.4 19.0 × 10 ⁻³ 199 3.2 50.7 77 14.6 × 10 ⁻³ 199 3.2 50.7 77 10.3 10.3 112 112 112 50.7 86.6 17.7 10.8 10.8 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.2 11.3 11.3 11.3 11.3 11.3 11.3 11.3 11.3 11.3 11.3 11.3 <	9.	24.2	47.5	77.2 × 10	229	
36.6 58.6 44.6 × 10 343 13. 38.4 61.1 39.0 × 10 343 13. 40.2 63.6 33.6 × 10 343 13. 42.0 66.1 29.4 × 10 3 254 7. 43.7 68.6 25.2 × 10 3 254 4	2 :	3 - 2	50.3	68.4 × 10	408	78.0
38.4 61.1 39.0 × 10 343 40.2 63.6 33.6 × 10 270 99.1 42.0 66.1 29.4 × 10 254 66.4 42.0 66.1 29.4 × 10 254 66.4 43.7 71.1 21.9 × 10 234 6.6 47.2 73.4 19.0 × 10 234 6.6 47.2 73.4 19.0 × 10 199 3.1 50.7 77.9 14.6 × 10 192 2.2 57.5 86.6 8.76 × 10 112 112 59.2 84.5 9.77 × 10 125 1.1 59.2 86.6 8.76 × 10 1.12 0 60.9 90.7 6.90 × 10 9 0 62.6 92.8 6.90 × 10 9 0 64.3 94.7 4.86 × 10 1 7 64.0 96.6 6.08 × 10 1 7 66.0 96.6 6.08 × 10 1 7 66.0 96.6 4.86 × 10 1 7 67.7 100.4 3.99 × 10 1 7 71.0 102.2 3.54 × 10 1 5 72.7 104.		31.1		5-01 × 3-0-2	619	36.9
40.2 63.6 33.6 × 10 ⁻³ 270 42.0 66.1 29.4 × 10 ⁻³ 264 45.5 71.1 21.9 × 10 ⁻³ 254 45.5 71.1 21.9 × 10 ⁻³ 234 49.0 77.9 16.6 × 10 ⁻³ 182 50.7 77.9 14.6 × 10 ⁻³ 182 52.4 80.2 13.0 × 10 ⁻³ 182 52.4 80.2 13.0 × 10 ⁻³ 163 52.5 86.6 8.76 × 10 ⁻³ 108 60.9 90.7 6.98 × 10 ⁻³ 108 61.1 100.2 3.54 × 10 ⁻³ 70 62.6 3.9 × 10 ⁻³ 70 63.1 104.0 3.54 × 10 ⁻³ 53 77.7 109.1 2.62 × 10 ⁻³ 53 77.7 109.1 2.62 × 10 ⁻³ 53 77.7 110.8 2.15 × 10 ⁻³ 53	18	35.9	33.1		141	37.7
40.2 63.6 33.6 × 10 264 42.0 66.1 29.4 × 10 3 264 43.7 68.6 25.2 × 10 3 234 47.2 71.1 21.9 × 10 3 234 45.5 71.1 21.9 × 10 3 219 219 49.0 77.9 14.6 × 10 3 182 22.4 80.2 13.0 × 10 3 182 22.4 80.2 13.0 × 10 3 182 22.5 × 10 3 13.0 × 10 3 182 22.5 × 10 3 13.0 × 10 3 142 11.3 × 10 3 142 11.3 × 10 3 142 11.3 × 10 3 142 11.3 × 10 3 142 11.3 × 10 3 142 11.3 × 10 3 11.2 90 90 90 90.7 66.9 8.6 6 8.76 × 10 3 11.2 90 90 90 90.7 66.9 90.7 66.9 × 10 3 90 90 90 90.7 66.9 90.8 6.90 × 10 3 90 90 90 90.7 66.0 90.6 4.34 × 10 3 77 90.6 64.3 90.7 65.9 × 10 3 90 × 10 3 90.7 90.8 90.8 90.8 90.8 90.8 90.8 90.8 90.8	19	34.8	22.8		604	31.2
42.0 66.1 29.4 × 10 254 4.7 4.7 4.2 4.3.7 68.6 25.2 × 10 3 254 4.5 5.7 4.0 2 254 4.7 2 73.4 19.0 × 10 3 294 4.7 2 73.4 19.0 × 10 3 19.0 ×	20	36.6	28.6		769	24.3
43.7 68.6 25.2 × 10 2 234 45.5 71.1 21.9 × 10 3 234 47.2 73.4 19.0 × 10 3 234 47.2 73.4 19.0 × 10 3 19.0 × 10 3 25.2 × 10 77.9 14.6 × 10 3 19.9 2.5 52.4 80.2 13.0 × 10 3 16.2 2.5 52.4 80.2 11.3 × 10 3 16.2 11.2 52.4 80.2 11.3 × 10 3 14.2 11.2 52.5 86.6 8.76 × 10 3 10.8 60.9 90.7 6.98 × 10 3 90 60.6 60.9 90.7 6.98 × 10 3 60.9 90.7 6.98 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.8 × 10 3 60.9 90.7 60.9 90.7 60.8 × 10 3 60.9 90.7 90.7 90.7 90.7 90.7 90.7 90.7 9	21	38.4	61.1		270	5 6 6
45.5 71.1 21.9 × 10 ⁻⁴ 234 9. 47.2 73.4 19.0 × 10 ⁻⁴ 219 4.1 50.7 77.9 14.6 × 10 ⁻³ 182 2. 52.4 80.2 13.0 × 10 ⁻³ 182 2. 52.4 80.2 13.0 × 10 ⁻³ 163 2. 55.8 84.5 13.0 × 10 ⁻³ 125 1. 55.8 86.6 8.76 × 10 ⁻³ 125 1. 60.9 90.7 6.90 × 10 ⁻³ 98 6. 62.6 92.8 6.90 × 10 ⁻³ 98 6. 63.5 94.7 6.90 × 10 ⁻³ 108 0. 64.3 94.7 6.90 × 10 ⁻³ 99 0. 65.0 90.8 6.90 × 10 ⁻³ 99 0. 67.7 98.5 4.86 × 10 ⁻³ 77 0. 66.0 96.6 4.34 × 10 ⁻³ 70 0. 77.0 100.4 3.54 × 10 ⁻³ 53 0. 77.1 100.1 2.26 × 10 ⁻³ 53 0. 77.4 110.8 2.15 × 10 ⁻³ 53 0. 77.7 110.8 2.15 × 10 ⁻³ 53 0. 77.7 110.8 2.15 × 10 ⁻³ 53 0. 64.4 115.5 1.77 × 10 ⁻³ 43 0.		40.2	63.6	33.6 × 10	407	5
47.2 73.4 19.0 × 10 ⁻³ 219 4.4 49.0 75.6 16.6 × 10 ⁻³ 199 2.5 50.7 77.9 14.6 × 10 ⁻³ 182 2.7 52.4 80.2 13.0 × 10 ⁻³ 163 2.7 54.1 82.4 11.3 × 10 ⁻³ 142 1.1 55.8 86.6 8.76 × 10 ⁻³ 112 0 62.6 92.8 6.08 × 10 ⁻³ 90 62.6 92.8 6.08 × 10 ⁻³ 90 62.6 92.8 6.08 × 10 ⁻³ 90 64.3 94.7 5.45 × 10 ⁻³ 77 64.3 94.7 5.45 × 10 ⁻³ 77 65.3 100.4 3.54 × 10 ⁻³ 70 69.3 100.4 3.54 × 10 ⁻³ 53 77.7 109.1 2.89 × 10 ⁻³ 53 77.7 109.1 2.89 × 10 ⁻³ 53 77.7 109.1 2.62 × 10 ⁻³ 53 77.7 109.1 2.62 × 10 ⁻³ 53 77.7 110.8 2.15 × 10 ⁻³ 53	1			- 01 2 4 40	300	8.82
47.2 75.6 16.6 × 10 ⁻³ 199 3. 50.7 77.9 14.6 × 10 ⁻³ 182 2. 50.7 77.9 14.6 × 10 ⁻³ 182 2. 54.1 82.4 11.3 × 10 ⁻³ 142 11. 55.8 84.6 8.76 × 10 ⁻³ 112 10. 50.2 88.6 7.78 × 10 ⁻³ 112 0. 60.9 90.7 6.98 × 10 ⁻³ 99 0.0 6.4.3 90 0.0 6.4.3 90.7 6.98 × 10 ⁻³ 90 0.0 6.50 × 10 ⁻³ 108 0.0 6.0 90.7 6.98 × 10 ⁻³ 73 6.0 90.6 4.34 × 10 ⁻³ 73 6.0 90.6 6.0 90.6 4.34 × 10 ⁻³ 73 6.0 90.7 10.0 102.2 3.54 × 10 ⁻³ 59 70 72.7 104.0 3.54 × 10 ⁻³ 59 70 72.7 104.0 3.54 × 10 ⁻³ 59 70 72.7 104.0 3.54 × 10 ⁻³ 53 72.7 104.0 3.16 × 10 ⁻³ 53 72.7 104.0 112.4 1.97 × 10 ⁻³ 53 72.7 10.0 112.4 1.97 × 10 ⁻³ 53 72.7 10.0 112.4 1.97 × 10 ⁻³ 53 72.7 10.0 112.4 1.97 × 10 ⁻³ 53 1.77 × 10 ⁻³ 53 1.77 × 10 ⁻³ 4.9	23	42.0	66.1			6.45
49.0 75.6 10.0 1 182 2. 50.7 77.9 14.6 × 10 -1 163 2. 52.4 80.2 11.3 × 10 -1 142 1. 54.1 82.4 11.3 × 10 -1 125 1. 55.8 86.6 8.76 × 10 -1 125 1. 50.9 90.7 6.98 × 10 -1 108 0. 60.9 90.7 6.98 × 10 -1 108 0. 64.3 94.7 6.98 × 10 -1 108 0. 65.0 90.6 6.98 × 10 -1 109 0. 65.1 10.0 10.2 3.94 × 10 -1 10. 72.7 100.4 3.94 × 10 -1 5. 74.4 105.7 2.89 × 10 -1 5. 74.4 105.7 2.89 × 10 -1 5. 75.4 110.8 2.15 × 10 -1 5. 64.7 110.8 2.15 × 10 -1 4. 64.7 110.8 2.15 × 10 -1 4. 65.4 115.5 1.77 × 10 -1 4.		43.7	9.89	25.2 × 10		
50.7 77.9 14.6 × 10.1 16.3 2. 52.4 80.2 13.0 × 10.1 16.3 12.5 54.1 82.4 11.3 × 10.1 142 11.2 55.8 86.6 8.77 × 10.1 112 0 60.9 90.7 6.90 × 10.1 108 60.9 90.7 6.90 × 10.1 108 64.3 94.7 5.45 × 10.1 98 66.0 96.6 4.86 × 10.1 77 65.1 100.4 3.54 × 10.1 72 72.7 100.4 3.54 × 10.1 55 72.7 100.1 2.69 × 10.1 5.3 76.0 107.4 2.62 × 10.1 5.3 76.0 107.4 2.62 × 10.1 5.3 77.7 109.1 2.15 × 10.1 5.3 76.0 112.4 1.97 × 10.1 4.3 76.1 112.4 1.97 × 10.1 4.3 76.1 112.4 1.97 × 10.1 4.3 76.1 112.4 1.97 × 10.1 4.3 76.1 112.4 1.97 × 10.1 4.3 76.1 112.4 1.97 × 10.1 4.3 76.1 113.9 1.77 × 10.1 4.3		45.5	71.1	21.9 × 10		3.00
52.4 80.2 13.0 × 10 10.2 10.3 10.2 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3			73.4	19.1 × 10		1.7.1
54.1 82.4 11.3 × 10 ⁻¹ 125 55.8 84.5 9.77 × 10 ⁻¹ 125 59.2 88.6 8.76 × 10 ⁻¹ 108 60.9 90.7 6.98 × 10 ⁻¹ 99 62.6 92.8 6.98 × 10 ⁻¹ 99 64.3 94.7 5.45 × 10 ⁻¹ 77 64.3 94.7 5.45 × 10 ⁻¹ 77 65.0 96.6 4.86 × 10 ⁻¹ 77 67.7 98.5 4.34 × 10 ⁻¹ 70 69.3 100.4 3.99 × 10 ⁻¹ 70 72.7 104.0 3.54 × 10 ⁻¹ 59 72.7 104.0 3.16 × 10 ⁻¹ 55 74.4 105.7 2.89 × 10 ⁻¹ 55 75.4 110.8 2.15 × 10 ⁻¹ 53 75.4 110.8 2.15 × 10 ⁻¹ 53		7			215	3.58
55.8 84.5 9.77×10 ⁻³ 125 55.8 86.6 8.76×10 ⁻³ 112 60.9 90.7 6.98×10 ⁻³ 108 62.6 92.8 6.08×10 ⁻³ 99 62.6 6.08×10 ⁻³ 99 64.3 94.7 6.08×10 ⁻³ 99 65.0 96.6 4.34×10 ⁻³ 77 66.0 96.6 4.34×10 ⁻³ 77 71.0 102.2 3.94×10 ⁻³ 79 72.7 104.0 3.16×10 ⁻³ 59 74.4 105.7 2.89×10 ⁻³ 53 76.0 107.4 2.62×10 ⁻³ 53 77.7 109.1 2.34×10 ⁻³ 53 77.7 10.8 2.15×10 ⁻³ 53 77.7 110.8 2.15×10 ⁻³ 53 77.7 110.8 2.15×10 ⁻³ 53 77.4 110.8 2.15×10 ⁻³ 49		49.0	0.07			3.08
57.5 86.6 8.76 × 10 ⁻³ 112 59.2 88.6 7.78 × 10 ⁻³ 108 60.9 90.7 6.99 × 10 ⁻³ 96 62.6 92.8 6.08 × 10 ⁻³ 99 64.3 94.7 4.86 × 10 ⁻³ 77 64.3 94.7 5.45 × 10 ⁻³ 77 66.0 96.6 4.34 × 10 ⁻³ 77 69.3 100.4 3.99 × 10 ⁻³ 70 69.3 100.4 3.54 × 10 ⁻³ 70 71.0 102.2 3.54 × 10 ⁻³ 59 72.7 109.1 2.89 × 10 ⁻³ 55 74.4 105.7 2.89 × 10 ⁻³ 53 76.0 107.4 2.62 × 10 ⁻³ 53 76.0 107.4 2.95 × 10 ⁻³ 53 76.0 107.4 2.95 × 10 ⁻³ 53 77.7 109.1 2.15 × 10 ⁻³ 53 76.0 112.4 1.97 × 10 ⁻³ 53 76.4 115.5 1.67 × 10 ⁻³ 43		50.7	17.9			2.65
57.5 86.6 8.75 × 10.8 10.8 10.8 10.8 10.9 10.9 10.9 10.9 10.9 10.9 10.9 10.9		52.4	80.2			2.10
59.2 88.6 7.78 × 10 108 60.9 60.9 90.7 66.9 × 10 10 108 60.9 60.9 × 10 10 108 60.9 60.9 × 10 10 108 60.9 60.9 60.8 × 10 10 10 108 60.0 90.7 66.0 90.6 4.34 × 10 10 10 10 10 10 10 10 10 10 10 10 10		54.1	82.4	11.3 × 10		1.72
60.9 90.7 6.90 × 10 ⁻³ 98 60.9 6.03 × 10 ⁻³ 98 60.0 6.04.3 94.7 5.45 × 10 ⁻³ 73 66.0 96.6 4.86 × 10 ⁻³ 73 66.0 96.6 4.86 × 10 ⁻³ 73 67.7 98.5 4.34 × 10 ⁻³ 70 69.3 100.4 3.93 × 10 ⁻³ 70 69.3 100.4 3.54 × 10 ⁻³ 70 69.3 100.4 3.54 × 10 ⁻³ 59 72.7 104.0 3.16 × 10 ⁻³ 59 74.4 105.7 2.89 × 10 ⁻³ 53 76.0 107.4 2.62 × 10 ⁻³ 53 77.7 109.1 2.34 × 10 ⁻³ 53 77.7 109.1 2.15 × 10 ⁻³ 53 77.7 109.1 2.15 × 10 ⁻³ 53 79.4 110.8 2.15 × 10 ⁻³ 53 79.4 110.8 2.15 × 10 ⁻³ 53 79.4 115.5 1.77 × 10 ⁻³ 49 64.4 115.5 1.64 × 10 ⁻³ 49		55.8	84.5	9.77 × 10		-
62.6 92.8 6.08 × 10 ⁻³ 90 64.3 94.7 5.45 × 10 ⁻³ 77 66.0 96.6 4.38 × 10 ⁻³ 73 67.7 98.5 4.34 × 10 ⁻³ 70 65.3 100.4 3.99 × 10 ⁻³ 70 71.0 102.2 3.54 × 10 ⁻³ 69 72.7 104.0 3.16 × 10 ⁻³ 59 72.7 104.0 3.16 × 10 ⁻³ 55 74.4 105.7 2.89 × 10 ⁻³ 55 75.4 110.8 2.15 × 10 ⁻³ 53 77.7 109.1 2.34 × 10 ⁻³ 53 77.7 110.8 2.15 × 10 ⁻³ 53 75.4 110.8 2.15 × 10 ⁻³ 53 75.4 110.8 2.15 × 10 ⁻³ 53 75.4 115.5 1.54 × 10 ⁻³ 49		575	86.6	8.76 × 10		
64.3 94.7 5.45 × 10 ⁻³ 77 66.0 96.6 4.86 × 10 ⁻³ 73 66.0 96.6 4.34 × 10 ⁻³ 70 65.0 100.4 3.99 × 10 ⁻³ 70 69.3 100.4 3.99 × 10 ⁻³ 70 70 72.7 104.0 3.16 × 10 ⁻³ 59 70.0 72.7 104.0 3.16 × 10 ⁻³ 55 70.0 70.4 70.4 105.7 2.69 × 10 ⁻³ 55 70.0 100.4 2.54 × 10 ⁻³ 55 70.0 100.4 2.54 × 10 ⁻³ 55 70.0 112.4 110.8 2.15 × 10 ⁻³ 52 61.0 112.4 1.97 × 10 ⁻³ 52 61.0 112.4 1.97 × 10 ⁻³ 66.0 1.0 112.4 1.97 × 10 ⁻³ 60.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	35	2 2	88.6	7.78 × 10	146	1.1
64.3 94.7 98.5 10.3 73 66.0 96.6 4.34 × 10.3 70 66.0 96.6 4.34 × 10.3 70 69.5 10.4 3.99 × 10.3 70 71.0 102.2 3.54 × 10.3 70 72.7 104.0 3.16 × 10.3 75.7 74.4 105.7 2.89 × 10.3 53 75.7 77.7 109.1 2.62 × 10.3 53 75.7 77.7 109.1 2.15 × 10.3 53 75.4 77.7 110.8 2.15 × 10.3 53 75.4 77.7 110.8 2.15 × 10.3 53 75.4 77.7 110.8 1.97 × 10.3 53 75.4 77.7 110.8 1.97 × 10.3 53 75.4 77.7 110.8 1.97 × 10.3 53 75.4 77.7 10.3 75.4 75.4 75.4 75.4 75.4 75.4 75.4 75.4		4.60	3			£16.0
66.0 96.6 4.500 10.3 67.7 98.5 4.34 × 10 -3 70 69.3 100.4 3.95 × 10 -3 70 71.0 102.2 3.54 × 10 -3 69 72.7 104.0 3.16 × 10 -3 59 74.4 105.7 2.89 × 10 -3 55 74.4 105.7 2.89 × 10 -3 53 77.7 109.1 2.34 × 10 -3 53 77.7 10.8 2.15 × 10 -3 53 77.7 110.8 2.15 × 10 -3 53 79.4 112.4 1.97 × 10 -3 49 6 81.0 112.4 1.77 × 10 -3 49 6 84.4 115.5 1.64 × 10 -3 49	7.	6.09	20.7	6.90 × 10		91.0
67.7 98.5 4.34×10 65.3 100.4 3.99×10 ⁻³ 70 71.0 102.2 3.54×10 ⁻³ 69 72.7 104.0 3.16×10 ⁻³ 59 74.4 105.7 2.89×10 ⁻³ 55 74.4 105.7 2.89×10 ⁻³ 55 77.7 109.1 2.34×10 ⁻³ 53 77.7 109.1 2.34×10 ⁻³ 53 77.7 110.8 2.15×10 ⁻³ 53 6 112.4 1.97×10 ⁻³ 49 8 64.4 115.5 1.64×10 ⁻³ 49		62.6	92.8	6.08 × 10		
69.3 100.4 3.99 × 10 70 70 71.0 102.2 3.54 × 10 -3 69 72.7 104.0 3.16 × 10 -3 59 76.7 104.0 3.16 × 10 -3 55 76.0 107.4 109.1 2.62 × 10 -3 53 77.7 109.1 2.34 × 10 -3 53 77.7 110.8 2.15 × 10 -3 53 77.4 110.8 2.15 × 10 -3 53 77.4 113.9 1.77 × 10 -3 54 75 75 75 75 75 75 75 75 75 75 75 75 75			7	5.45 × 10	_	
71.0 102.2 3.54 × 10 ⁻² 69 72.7 104.0 3.16 × 10 ⁻³ 59 72.7 104.0 3.16 × 10 ⁻³ 55 74.4 105.7 2.89 × 10 ⁻³ 55 76.0 107.4 2.62 × 10 ⁻³ 53 77.7 109.1 2.34 × 10 ⁻³ 53 77.4 110.8 2.15 × 10 ⁻³ 53 6 81.0 112.4 1.97 × 10 ⁻³ 49 7 82.7 113.9 1.77 × 10 ⁻³ 49 8 64.4 115.5 1.64 × 10 ⁻³ 49		3	9 90	4.86 × 10 ⁻³	3	90.00
72.7 104.0 3.16 × 10 ⁻³ 59 74.4 105.7 2.89 × 10 ⁻³ 55 76.0 107.4 2.62 × 10 ⁻³ 53 77.7 109.1 2.34 × 10 ⁻³ 53 77.7 109.1 2.34 × 10 ⁻³ 53 81.0 112.4 1.97 × 10 ⁻³ 52 82.7 113.9 1.77 × 10 ⁻³ 49 64.4 115.5 1.64 × 10 ⁻³ 43		9		4 34 × 10 -2	*	0.417
74.4 105.7 2.89×10 ⁻³ 55 3 76.0 107.4 2.62×10 ⁻³ 53 4 77.7 109.1 2.34×10 ⁻³ 53 5 75.4 110.8 2.15×10 ⁻³ 53 75.4 112.4 1.97×10 ⁻³ 52 6 81.0 112.4 1.97×10 ⁻³ 49 8 64.4 115.5 1.64×10 ⁻³ 49		67.7		- 00 × 10 -	6	0.346
74.4 105.7 2.89×10 35 76.0 107.4 2.62×10 ⁻³ 53 77.7 109.1 2.34×10 ⁻³ 53 75.4 110.8 2.15×10 ⁻³ 53 81.0 112.4 1.97×10 ⁻³ 52 82.7 113.9 1.77×10 ⁻³ 43 64.4 115.5 1.64×10 ⁻³ 43	38	69.3	100.4		5	0.294
76.0 107.4 2.62×10 ⁻³ 53 77.7 109.1 2.34×10 ⁻³ 53 79.4 110.8 2.15×10 ⁻³ 53 81.0 112.4 1.97×10 ⁻³ 52 82.7 113.9 1.77×10 ⁻³ 49 64.4 115.5 1.64×10 ⁻³ 43	40	71.0	102.2	5.54 TO		0.259
77.7 109.1 2.34×10 ⁻³ 53 75.7 109.1 2.15×10 ⁻³ 53 81.0 112.4 1.97×10 ⁻³ 52 82.7 113.9 1.77×10 ⁻³ 49 64.4 115.5 1.64×10 ⁻³ 43	41	72.7	104.0	1.16 × 10		0.219
75.4 110.8 2.15 × 10 ⁻³ 53 81.0 112.4 1.97 × 10 ⁻³ 52 82.7 113.9 1.77 × 10 ⁻³ 49 64.4 115.5 1.64 × 10 ⁻³ 43		74.4	105.7	2.89 × 10		3
81.0 112.4 1.97×10 ⁻³ 52 82.7 113.9 1.77×10 ⁻³ 49 64.4 115.5 1.64×10 ⁻³ 43		76.0	107.4	2.62 × 10	£	
81.0 112.1 1.77×10 ⁻³ 49 82.7 113.9 1.77×10 ⁻³ 43 64.4 115.5 1.64×10 ⁻³ 43			1 901	2.34 × 10 -	12	0.169
82.7 113.9 1.17 2.5 63.4 115.5 1.64×10-3 43	87	7		ļ		
64.4 115.5 1.64.7 10 1	170					
	164					
71 OT X						
ACC 118.6 1.35 × 10 39	37					
1.26 × 10 -3						

TABLE A.19 SHOT NAVAJO ROUND 6B, QE 85 DEGREES

Time	Range	Altitude	Factor	Reading	Concentration
sec	10 ³ ft	10 ⁵ ft	(mc/m³)/(r/hr)	r/hr	mc/m³
13	5.0	45.0	85.0 × 10 ⁻³	30	2.55
14	5.4	48.9	72.6×10^{-3}	174	12.6
15	5.9	52.9	60.2×10^{-3}	392	23.6
16	6.3	56.4	49.8×10^{-3}	313	15.6
17	6.7	59.9	42.6×10^{-3}	204	8.69
18	7.1	63.5	33.9×10^{-3}	189	6.41
19	7.6	67.0	27.7×10^{-3}	91	2.52
20	9.0	70.5	22.5×10^{-3}	68	1.53
21	8.4	73.8	18.6×10^{-3}	38	0.70

TABLE A.20 SHOT TEWA ROUND 3, QE 75 DEGREES

Time	Range	Altitude	Factor	Reading	Concentration
sec	10 ³ ft	10 ³ ft	(mc/m³)/(r/hr)	r/hr	mc/m³
12	13.3	39.0	104.3×10^{-3}	8	0.796
13	14.6	42.6	92.4×10^{-3}	21	1.99
14	15.9	46.4	80.8×10^{-3}	79	6.42
15	17.2	50.0	69.1×10^{-3}	245	16.9
16	18.4	53.3	58.8×10^{-3}	539	31.7
17	19.6	56.6	49.4×10^{-3}	1,029	50.9
18	20.9	59.8	42.7×10^{-3}	1,720	73.5
19	22.1	63.1	34.4×10^{-3}	2,400	82.6
20	23.3	66.4	28.8×10^{-3}	2,768	79.9
21	24.5	69.4	24.0×10^{-3}	2,746	65.8
2 2	25.6	72.4	20.3×10^{-3}	2,459	49.9
23	26.8	75.4	16.7×10^{-3}	2,143	36.0
24	28.0	78.4	14.3×10^{-3}	1,860	26.6
25	29.2	81.4	12.1×10^{-3}	1,616	19.5
26	30.3	84.1	10.0×10^{-3}	1,448	14.5
27	31.5	86.9	8.55×10^{-3}	1,298	11.1
28	32.6	89.7	7.33×10^{-3}	1,182	8.67
29	33.9	92.5	6.22×10^{-3}	1,043	6.49
30	34.9	95.3	5.27×10^{-3}	913	4.81
31	36.1	97.9	4.45×10^{-3}	808	3.60
32	37.2	100.5	3.95×10^{-3}	742	2.93
33	38.4	103.1	3.30×10^{-3}	663	2.19
34	39.5	105.6	2.89×10^{-3}	628	1.82
35	40.6	108.2	2.48×10^{-3}	563	1.40
36	41.8	110.7	2.16×10^{-3}	508	1.10
37	42.9	113.1	1.88×10^{-3}	483	0.907
38	14.0	115.5	1.64×10^{-3}	427	0.699
39	45.2	118.0	1.40×10^{-3}	408	0.569